A330
TECHNICAL TRAINING MANUAL
MECHANICAL & AVIONICS COURSE - T1+T2 (LVL 2&3)
(RR Trent 700)
OXYGEN

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OXYGEN

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW

CREW OXYGEN SUPPLY

The flight crew oxygen is stored in a High Pressure (HP) oxygen cylinder. This cylinder is located in the avionics compartment and placed in a cradle. The HP oxygen cylinder can be isolated for maintenance by a manual ON/OFF valve. The oxygen is supplied to the flight crew stations through a distribution circuit. HP is reduced to LP by the pressure regulator/transmitter. LP oxygen flows via the LP supply valve to the distribution manifold from where the mask stowage boxes in the cockpit are supplied. Each mask stowage box has a full-face quick donning mask. The LP supply valve can be switched off from the cockpit for maintenance action as well as in ground configuration. The system is protected if an overpressure occurs in a high or low-pressure circuit. The overpressure is vented overboard. The oxygen pressure condition is indicated on the DOOR/OXY page of the ECAM system. A test port is used for distribution leakage tests and a filling port is used for the refilling of oxygen without removal of the oxygen cylinder.

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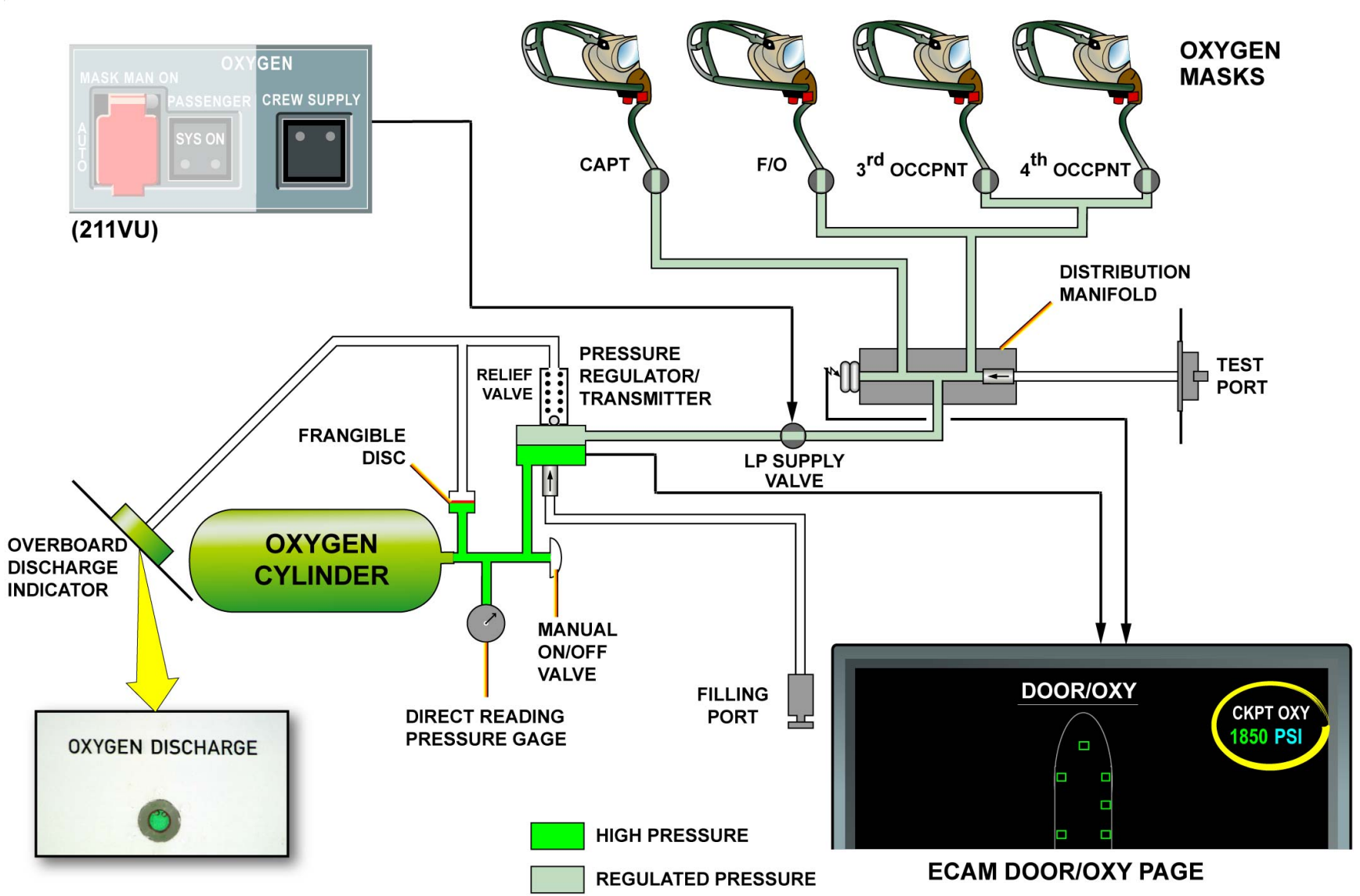

SYSTEM OVERVIEW - CREW OXYGEN SUPPLY

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW (continued)

CREW OXYGEN MASKS

The pilot oxygen masks are put in a storage box on both side consoles. To use the mask the crew member squeezes the red grips to pull the mask out of the box, and this action causes the mask harness to inflate to put the mask on. With the mask in position and the red grips released, the oxygen mask will be supplied with oxygen. A mask-mounted regulator supplies a mixture of air and oxygen or pure oxygen, or gives emergency pressure control. With the regulator set to Normal, the user breathes a mixture of cabin air and oxygen up to the cabin altitude at which the regulator supplies 100% oxygen on demand. The user can select 100%, in that case the regulator supplies pure oxygen at all cabin altitudes on demand. Depending on the situation, the user can turn the EMERGENCY rotating knob to receive pure oxygen under pressure. The EMERGENCY rotating knob will also be used for a specific system test by pushing it. A flow blinker indicates oxygen flow. The PRESS TO TEST AND RESET control button lets the oxygen flow be tested as well as reset the oxygen system.

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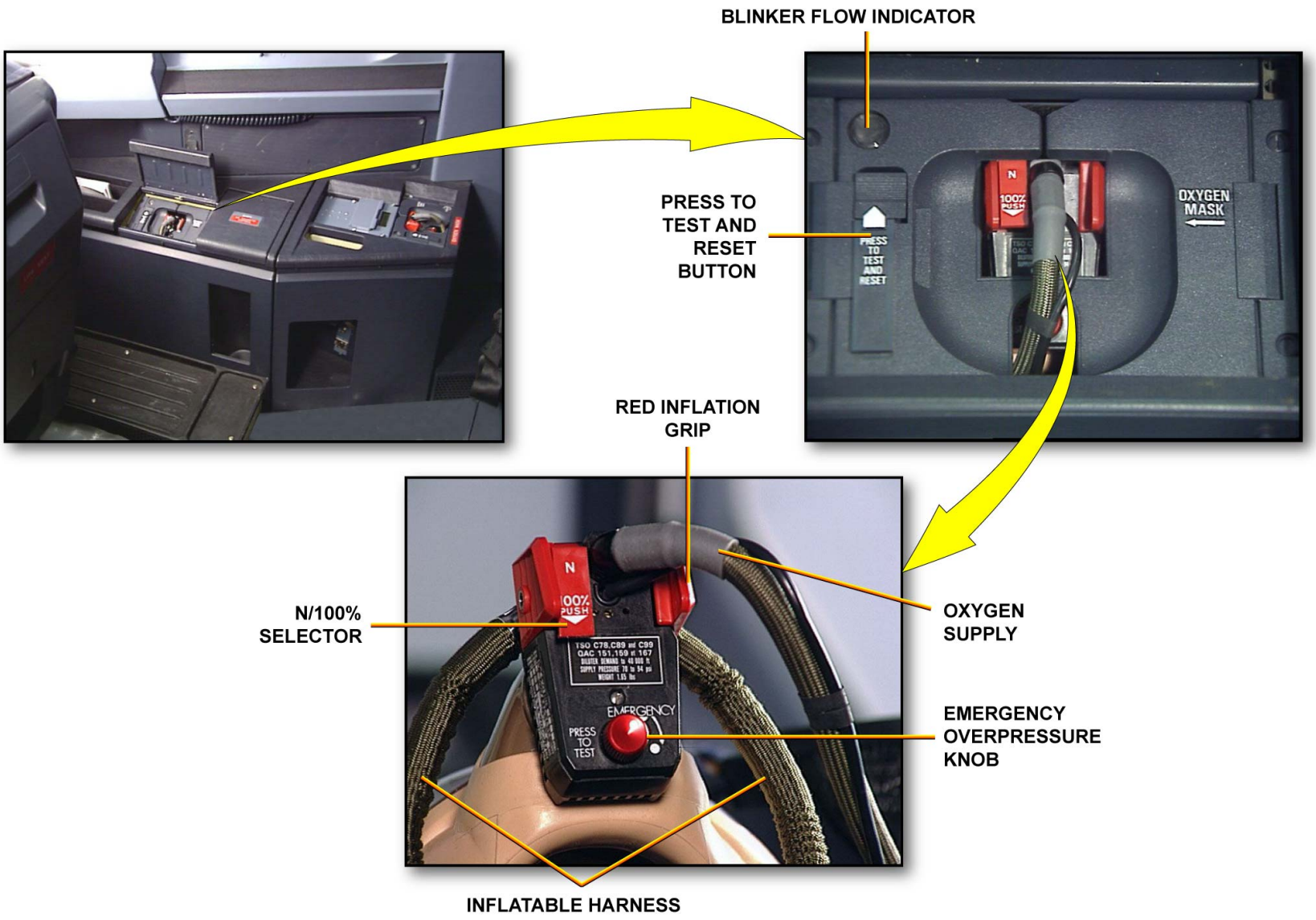

SYSTEM OVERVIEW - CREW OXYGEN MASKS

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW (continued)

PASSENGER OXYGEN SYSTEM

Oxygen masks are released automatically with a cabin depressurization and an aircraft altitude over 14.000 ft, or manually anytime in flight or on ground via the OXYGEN panel in cockpit or with a manual release tool. The passenger oxygen system supplies cabin occupants with oxygen in the case of loss of cabin pressure altitude. The container doors open electrically. When pulling the mask towards the users face, the oxygen generator is activated and supplies pure oxygen to the masks for a limited time. After operation, the system has to be reset by pushing the OXYGEN TiMeR RESET P/B on the maintenance panel in order to return the electrical activation system to normal condition. The chemical generators used to generate oxygen are installed in special containers. These containers are located above the passenger seats, in the lavatories and at the cabin attendant stations.

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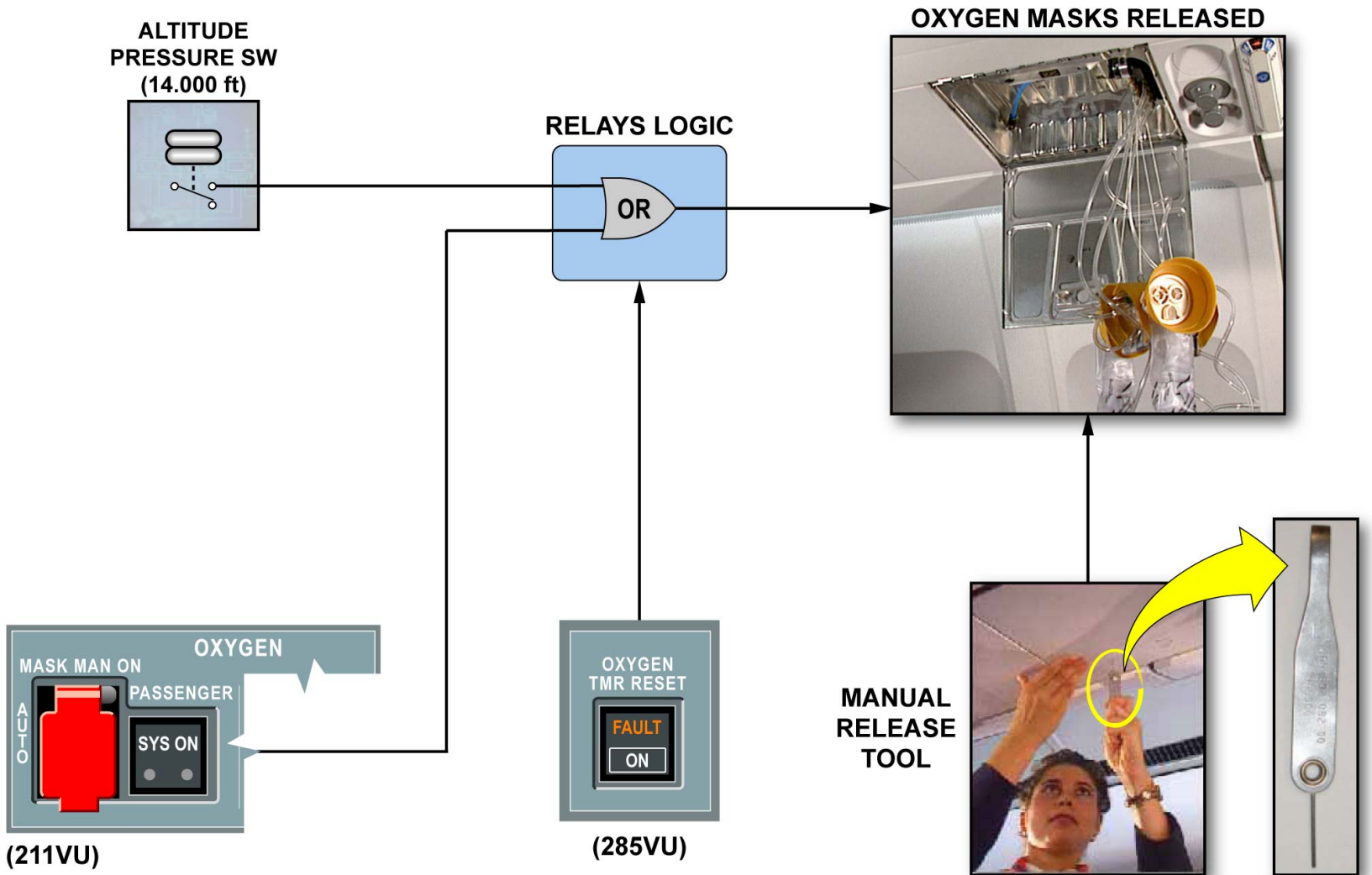

SYSTEM OVERVIEW - PASSENGER OXYGEN SYSTEM

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW (continued)

GASEOUS OXYGEN SYSTEM (OPTION)

The passenger gaseous oxygen system supplies oxygen to each oxygen container in case of an emergency.
The rate of the oxygen flow depends on the altitude, down to zero at 10.000 ft (3.050 m). HP oxygen is kept in oxygen cylinder assemblies located behind sidewall linings in the FWD cargo compartment. The standard system has 5 oxygen cylinders, plus up to 13 additional oxygen cylinders can be installed on airline request.
When the cabin pressure decreases to a pressure equivalent to 14.000 ft (4.300 m) the altitude SW closes. This starts the automatic operation of the oxygen system. The oxygen regulators open and deliver a regulated flow of oxygen to the two main supply lines. The oxygen masks container doors open pneumatically and the masks fall down. Oxygen only flows to the masks, which are pulled down.
The MASK MANual ON P/B on the OXYGEN panel can be pushed at any time to manually start the operation of the oxygen system.
After operation, the system is reseted by pushing the OXYGEN RESET P/B this brings the passenger oxygen system back to the initial configuration and the oxygen regulators will close.
The Quantity Calculation And Control Unit (QCCU) sends the temperature adjusted pressure to the ECAM DOOR/OXY page. It is also connected to the Central Maintenance Computer (CMC) for failures monitoring and system test.

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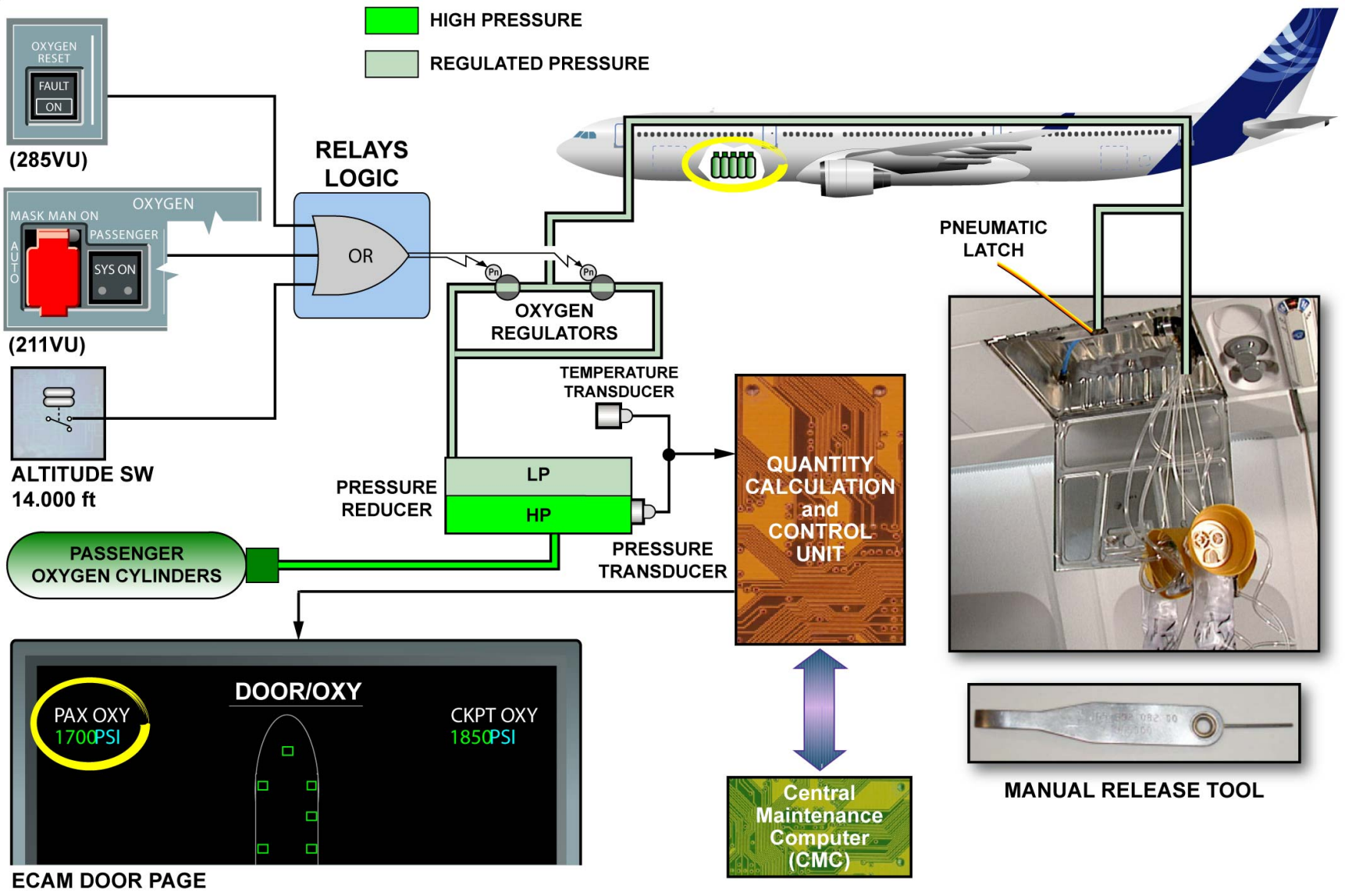

SYSTEM OVERVIEW - GASEOUS OXYGEN SYSTEM (OPTION)

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW (continued)

CREW PORTABLE OXYGEN SYSTEM

The portable oxygen system supplies oxygen to the flight crew, the cabin attendants and the passengers in case of emergency.
The flight crew portable oxygen device is a protective breathing-equipment (PBE) installed behind the pilots seat.
The cabin-attendants portable oxygen devices are of two types, the protective breathing equipments (PBE) and the high pressure oxygen cylinders with continuous flow type masks. They are installed at different locations in the cabin.
The primary use of the protective breathing equipment (PBE) is to supply oxygen to a flight crew member or a flight attendant if there is a fire, or an emission of smoke and/or noxious gas. It provides protection to the eyes and respiratory system and permits to move freely to extinguish a fire. It can also supply emergency-oxygen if the fixed emergency-oxygen system does not work. It ensures a total autonomy of 15 minutes.
The protective breathing-equipment is stored under vacuum in a specially designed sachet. The sachet is mounted inside a box in such a way that, after opening the box, the hood is removed and the vacuum protection is automatically opened with a single movement.

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PROTECTIVE BREATHING EQUIPMENT

SYSTEM OVERVIEW - CREW PORTABLE OXYGEN SYSTEM

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW (continued)

PORTABLE OXYGEN SYSTEM (PASSENGERS FIRST AID)

The cabin-attendants portable oxygen devices are of two types, the protective breathing equipments (PBE) and the high pressure oxygen cylinders with continuous flow type masks. They are installed at different locations in the cabin. The high-pressure oxygen cylinders with continuous-flow type masks supply first aid oxygen for the passengers. If necessary they can also supply oxygen to the cabin attendants.

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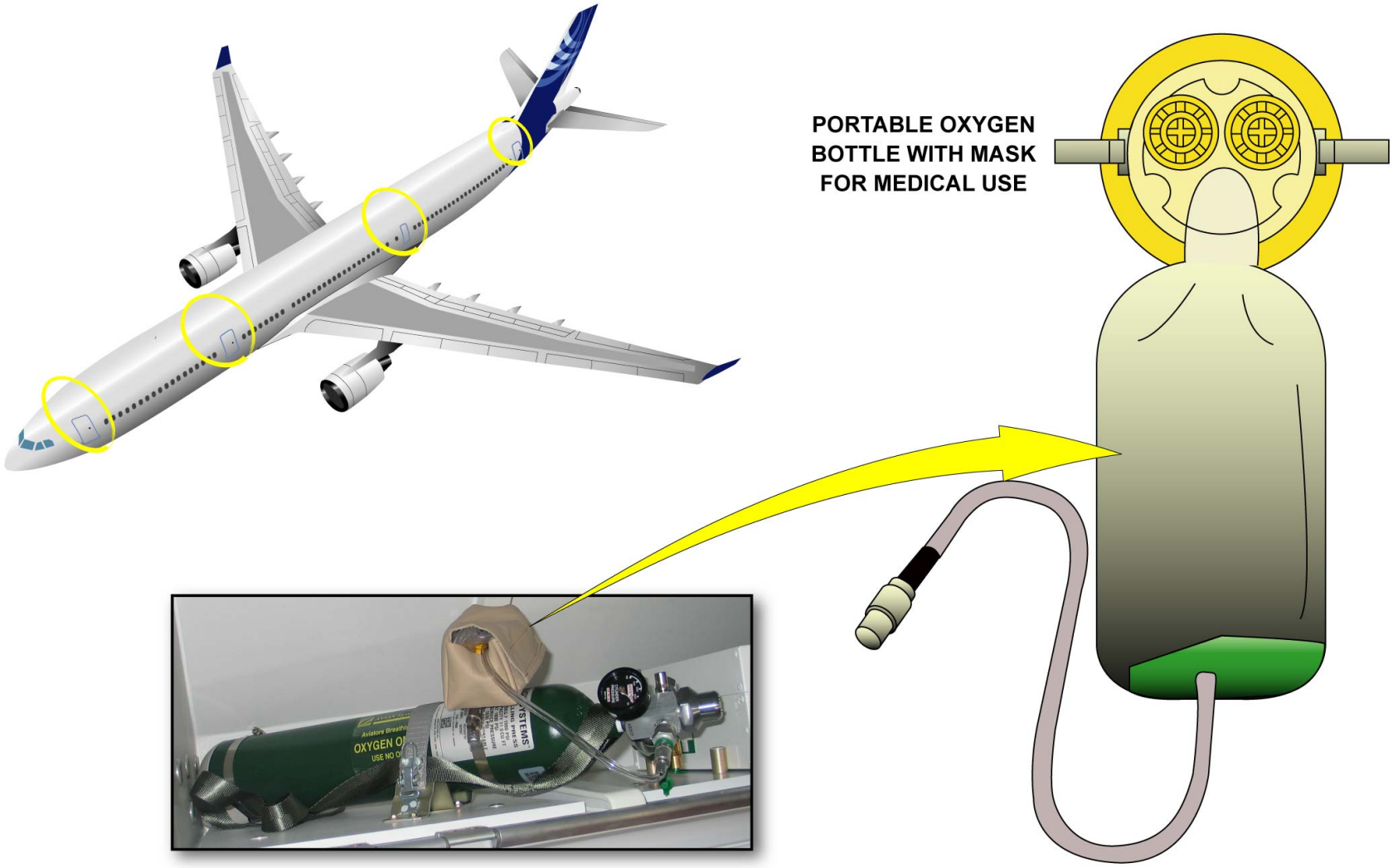

SYSTEM OVERVIEW - PORTABLE OXYGEN SYSTEM (PASSENGERS FIRST AID)

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SERVICING

CREW OXYGEN CYLINDER REMOVAL/INSTALLATION

The oxygen cylinder has to be removed in case of low contents (low pressure) or leakage and replaced by a fully charged cylinder.
Put the access platform in position and open the access door 811.
Close the oxygen cylinder ON/OFF valve.
Bleed and empty the oxygen system from the crew oxygen storage box in the cockpit.
Open, safety and tag the CREW OXY ConTroL circuit breaker 4HT on panel 742VU.
Disconnect the pressure regulator transmitter assembly from the oxygen cylinder.
Disconnect the HP safety hose from the cylinder head.
Loosen and open the straps, then remove the cylinder from the support.
Make sure that the parts kept from the removed component are clean and in the correct condition.
Check the expiration date on the cylinder to make sure that it can still be used.
Carefully put the cylinder on the support.
Close and tighten the straps.
Put a new conical seal on the union and tighten the HP safety connector on the cylinder head.
Put the regulator on the valve and tighten the nut.
Apply the special material solution to the mechanical connections.
Very slowly, open the valve of the cylinder 3.5 to 4 turns and let the pressure become stable, this occurs after approximately 90 seconds then fully open the cylinder valve.
Examine each connection to make sure that there are no leaks.
Rub off the special material solution.
Make sure that the work area is clean and clear of tools and other items.
Close the access door 811. Remove the safety clip and the tag. Close the circuit- breaker 4HT.

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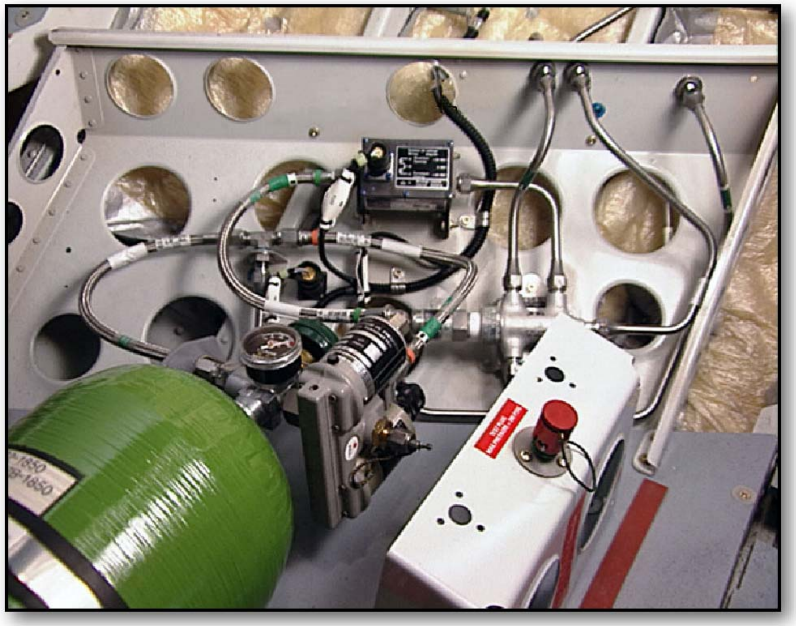
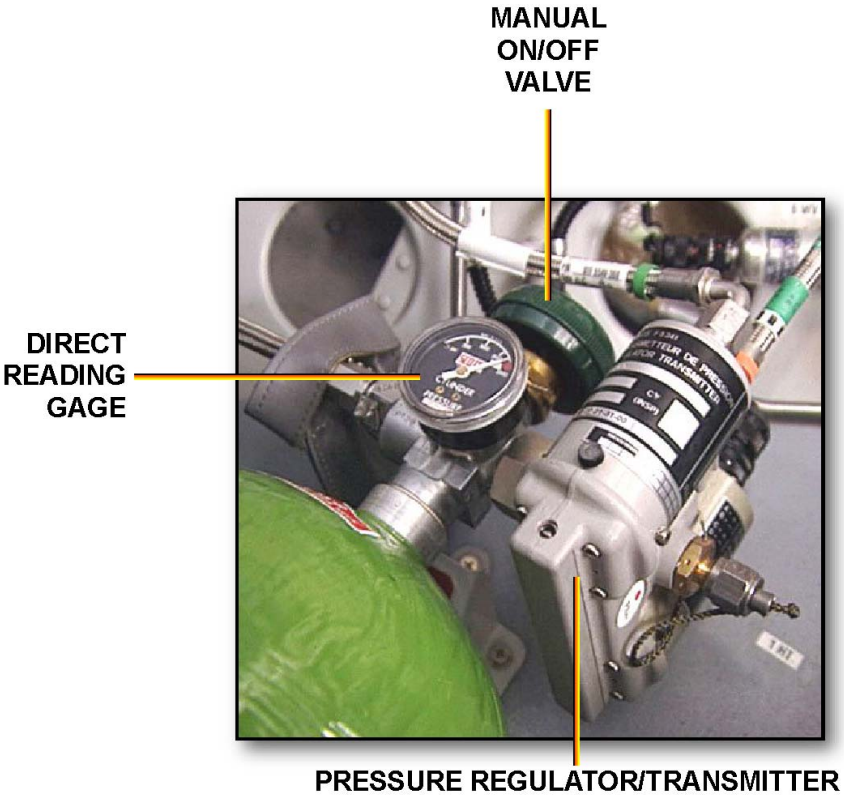


OXYGEN CYLINDER AND CONNECTIONS



SERVICING - CREW OXYGEN CYLINDER REMOVAL/INSTALLATION

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

SAFETY PRECAUTIONS

Keep all hydrocarbons (fuels, lubricants, etc.) away from oxygen sources. Oxygen becomes explosive when it comes in contact with hydrocarbons. Clean the tools and make sure your hands are clean to prevent contamination of the oxygen system. Put dry and clean metal or plastic plugs on all pipes or units temporarily removed. Put each pipe or unit in a sealed vinyl bag.

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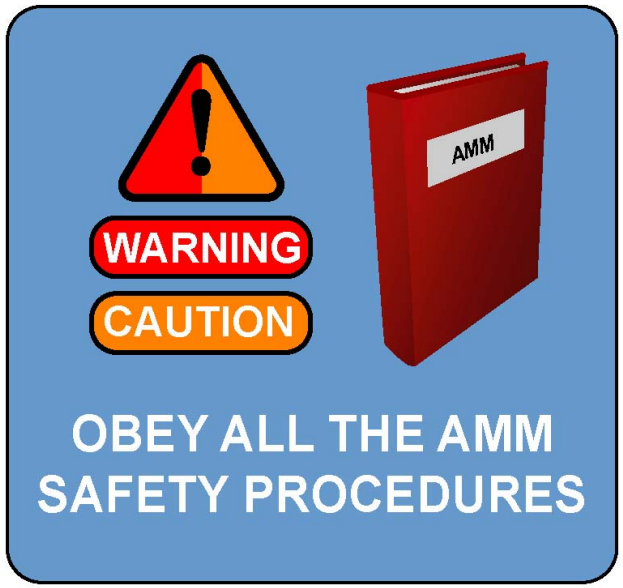

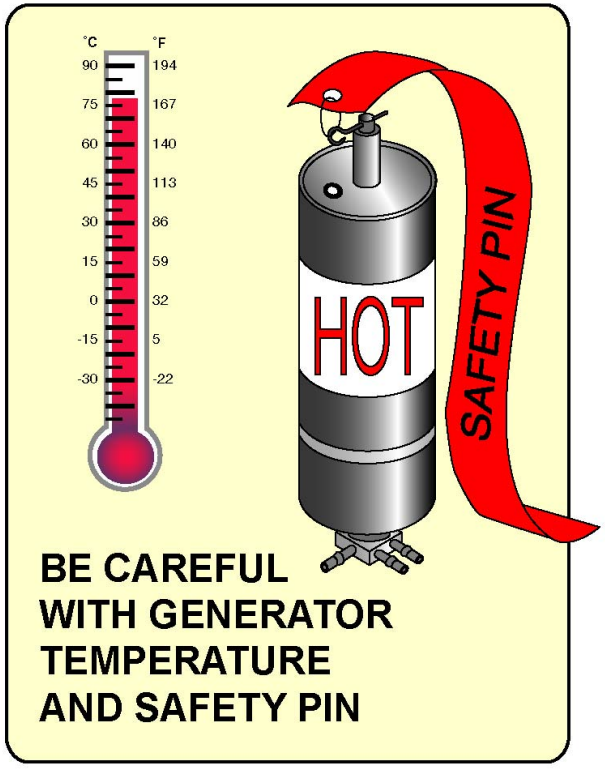

SERVICING - SAFETY PRECAUTIONS

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

CHECK OF HP INDICATION IN THE PASSENGER OXYGEN CYLINDERS (GAZEOUS SYSTEM)

Get access to the FWD cargo compartment then to the passenger oxygen cylinders (panel 132QW) and the QCCU (access door 132AZ).
Make sure that the warning lights on the QCCU are off.
To calculate the average pressure (PA) in the oxygen cylinders:
- read and write down the pressure shown on the gage of each oxygen cylinder,
- add the pressures together and divide the result by the number of oxygen cylinders installed.

Compare the average pressure in the oxygen cylinders with the pressure (PI) shown on the fill panel indicator (980WR).

NOTE: This procedure has to be applied in case of ECAM indication malfunction.

Use the table to calculate the oxygen corrected pressure.

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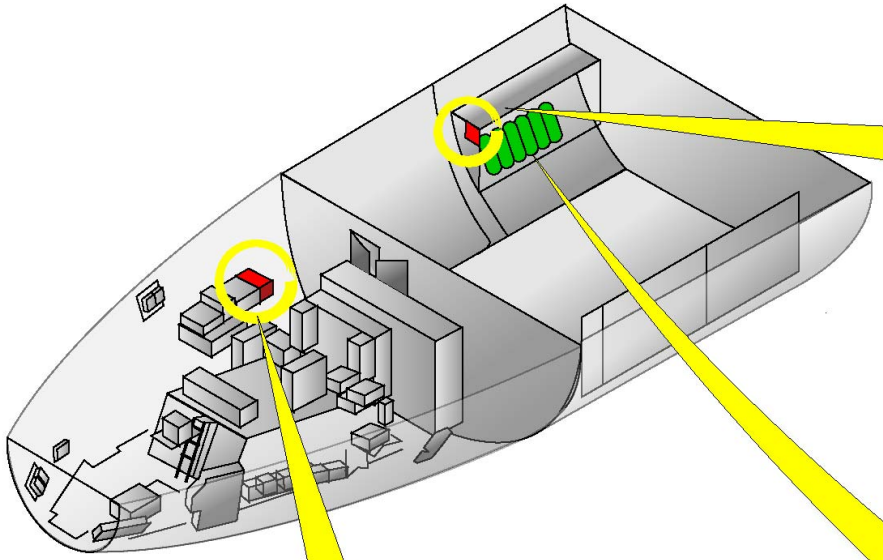
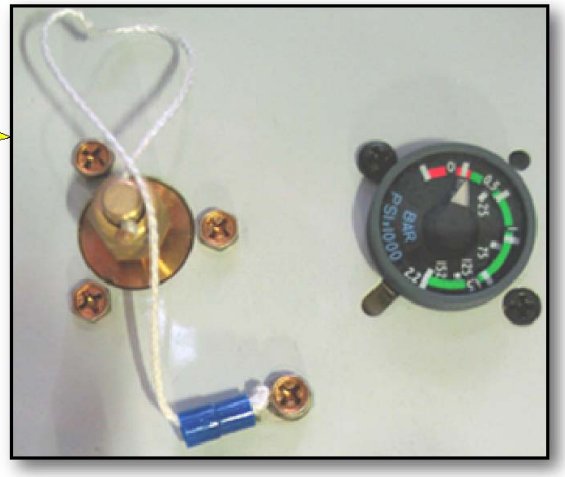
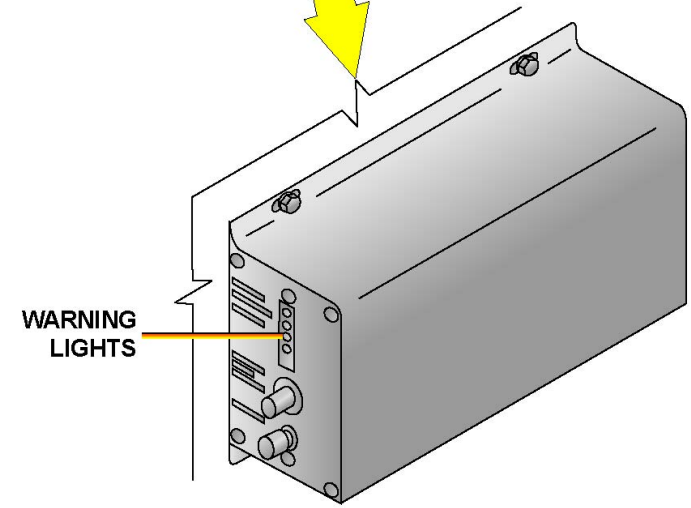
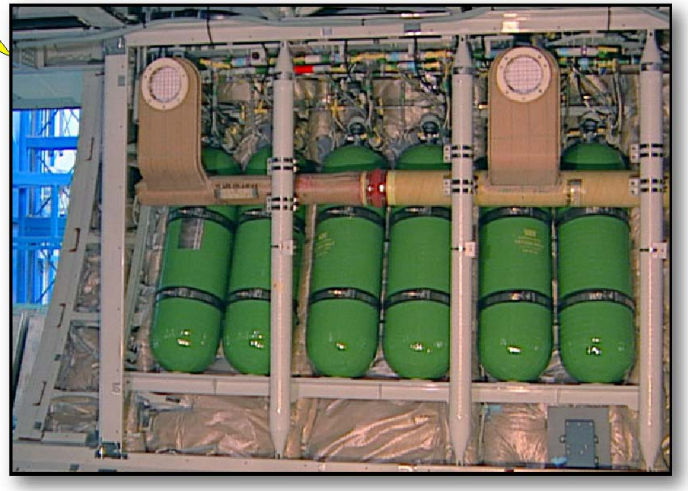




FILL PANEL INDICATION



QUANTITY CALCULATION CONTROL UNIT (QCCU)



GASEOUS SYSTEM

SERVICING - CHECK OF HP INDICATION IN THE PASSENGER OXYGEN CYLINDERS (GAZEOUS SYSTEM)

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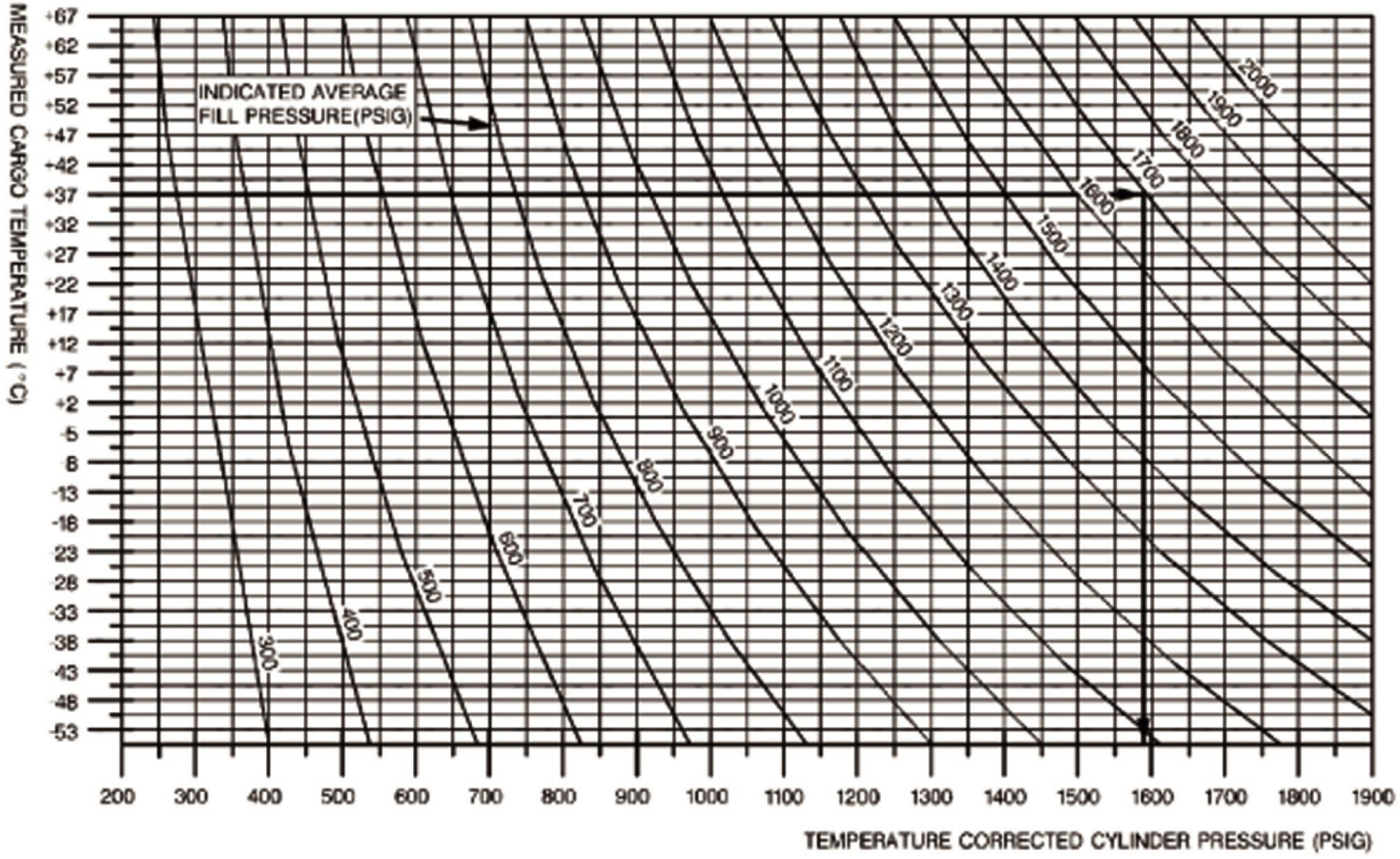

CHART OF TEMPERATURE CORRECTED PRESSURES

SERVICING - CHECK OF HP INDICATION IN THE PASSENGER OXYGEN CYLINDERS (GAZEOUS SYSTEM)

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

DAILY CHECK

During the daily check the external walk around will include the visual check of the crew oxygen cylinder overpressure (Green) discharge disc to be sure that it is not missing. The ECAM DOOR/OXY page shows the crew oxygen pressure indication. If the pressure is less than 1.500 PSI, a half box (advisory) is shown for information. In this case, check the AMM. This is to see if the minimum oxygen pressure available to the flight crew is within the permitted limits. Refer to the Minimum Flight Crew Oxygen Pressure chart and find the minimum pressure according to the ambient temperature and the number of crew members. If the pressure is less than the minimum flight crew oxygen pressure the oxygen cylinder must be changed or refilled according to required regulations.

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REF TEMPERATURE *		°C	-10	0	10	20	30	40	50
		°F	14	32	50	68	86	104	122
MIN ** BOTTLE PRESSURE (PSI)	2 CREW MEMBERS		520	540	560	580	600	620	640
	2 CREW MEMBERS	+ 1 0 BS	660	690	710	740	760	790	810
	2 CREW MEMBERS	+ 2 0 BS	810	850	880	910	940	970	1000

* REF TEMPERATURE:

- ON GROUND: $\frac{\text{OAT + CAB TEMP}}{2}$

- IN FLIGHT: CAB TEMP (°C) - 10°C
  OR CAB TEMP (°F) - 18°F

** MINIMUM BOTTLE PRESSURE TO COVER:

- PREFLIGHT CHECKS
- USAGE OF OXYGEN WHEN ONLY ONE PILOT IS IN THE COCKPIT
- UNUSABLE QUANTITY (TO ENSURE REGULATOR FUNCTIONING WITH MINIMUM PRESSURE)
- NORMAL SYSTEM LEAKAGE

AND

- PROTECTION AFTER LOSS OF CABIN PRESSURE WITH MASK REGULATOR ON NORMAL (DILUTED OXYGEN):
  - DURING EMERGENCY DESCENT FOR ALL COCKPIT MEMBERS FOR 15 MINUTES (REFER TO CABIN FIXED OXYGEN SYSTEM)
  - DURING CRUISE AT FL 100 FOR 2 CREW MEMBERS FOR 105 MINUTES.

OR

- PROTECTION AGAINST SMOKE WITH 100% OXYGEN FOR ALL COCKPIT MEMBERS DURING 15 MINUTES AT 8000 FT CABIN ALTITUDE.

NOTE: THE ABOVE TIMES WHICH ARE BASED ON THE USE OF SEALED MASK, MAY BE SHORTER FOR BEARDED CREW (IN TERMS OF PERFORMANCE, PRESSURE OR DURATION).

DAILY CHECK

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

WEEKLY CHECK

CHECK OF PORTABLE OXYGEN CONTENTS

Get access to the portable oxygen cylinders and check that the swivel of the pressure gage is in the red band. If the indicator of the pressure gage is not in the red band replace the oxygen cylinder by a serviceable unit.

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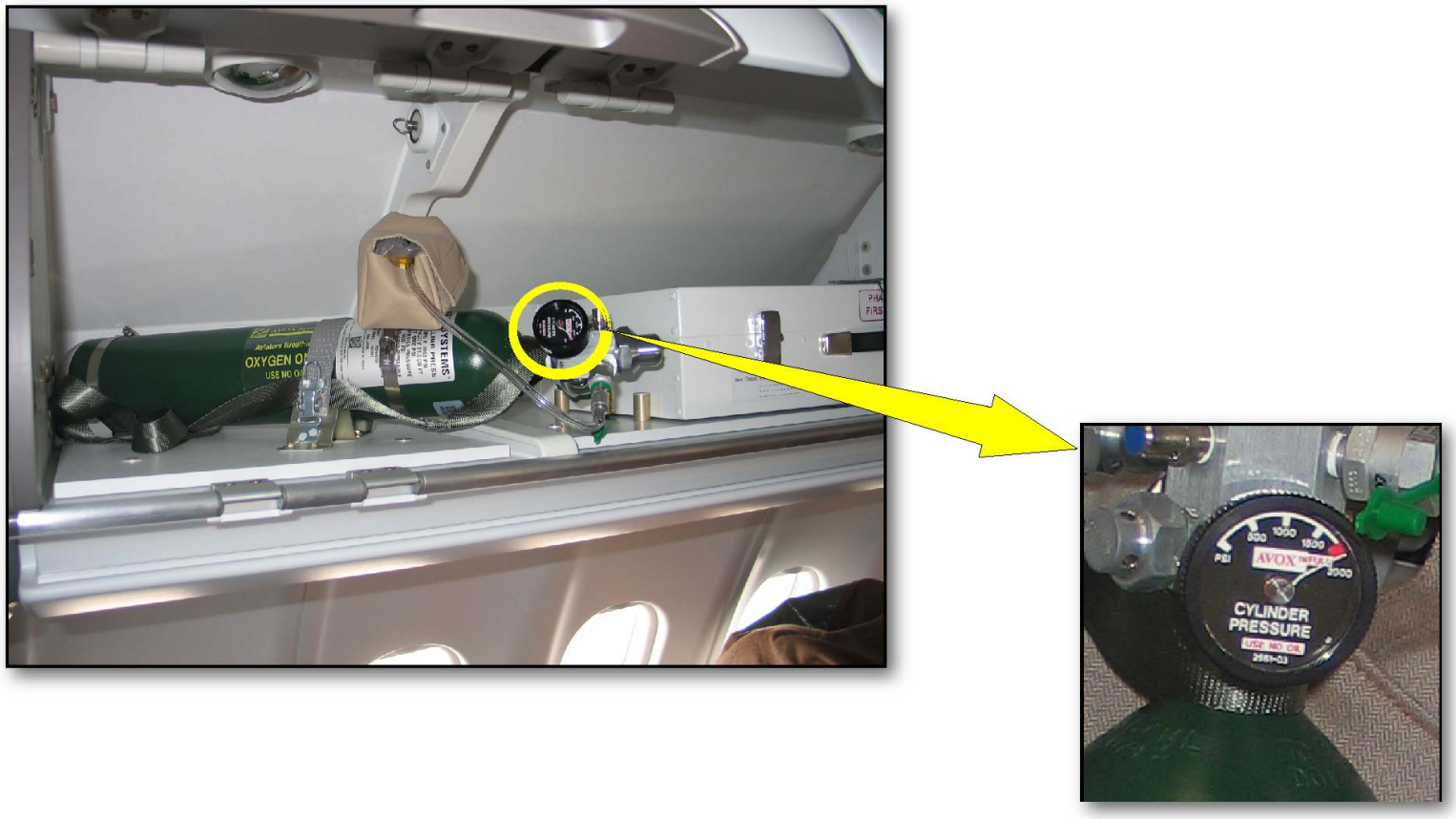
Make sure that the indicators on the pressure gages are in the red (FULL) band.



WEEKLY CHECK - CHECK OF PORTABLE OXYGEN CONTENTS

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

WEEKLY CHECK (continued)

CHECK OF PBE TAMPER SEAL

The primary use of Portable Breathing Equipment (PBE) is to supply oxygen to the cabin attendants and flight crew if there is a fire, emission of smoke or noxious gas. Check that the tamper seal, and the serviceability indicator are not broken and carry out a visual inspection of the humidity indicator on each PBE container. If a tamper seal or a serviceability indicator is broken, replace the PBE by a serviceable unit.

WARNING: THE OPERATIONAL COLOR OF THE HUMIDITY INDICATOR MUST BE GREEN.

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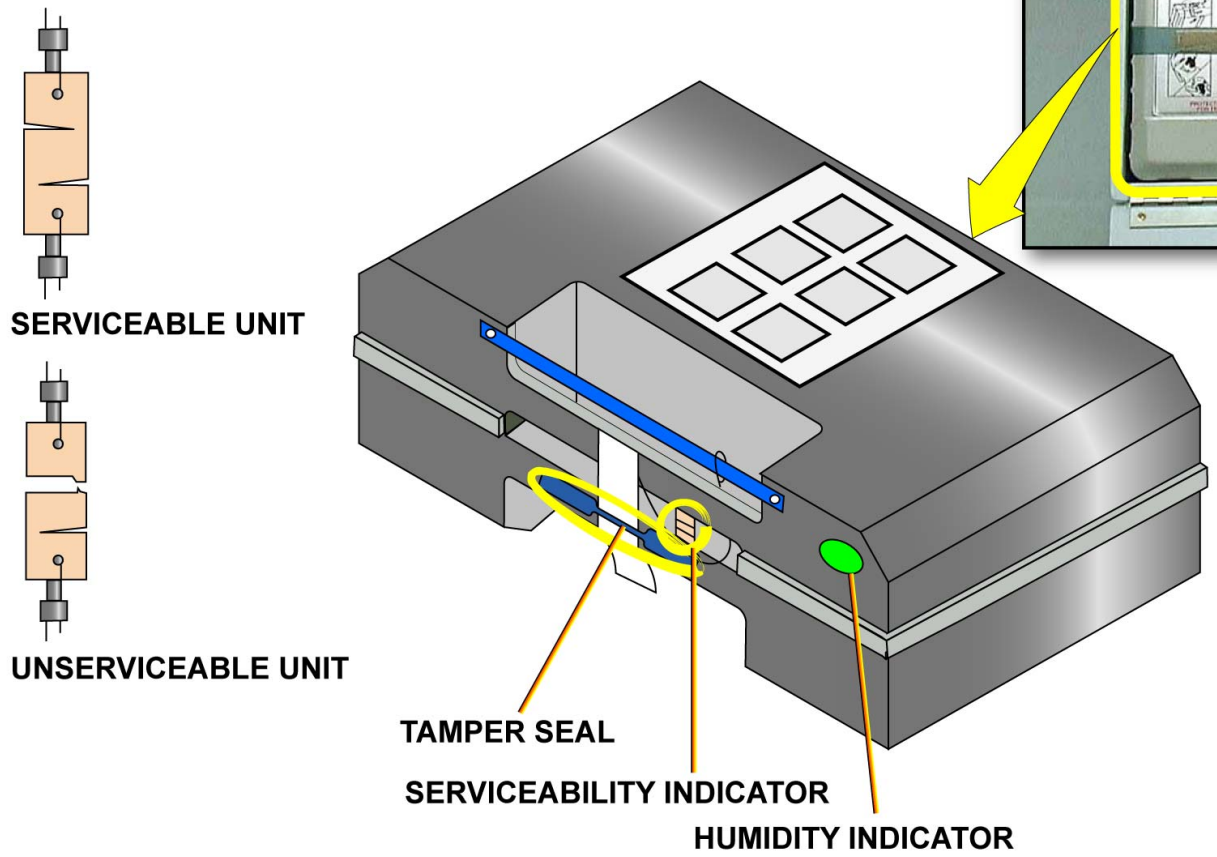
Make sure that the seal and the serviceability indicator are not broken.



WARNING

THE OPERATIONAL COLOR OF THE HUMIDITY INDICATOR MUST BE GREEN.

WEEKLY CHECK - CHECK OF PBE TAMPER SEAL

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MEL/DEACTIVATION

CREW OXYGEN SYSTEM

A quick donning cockpit oxygen mask must be operative for each cockpit occupant. If the oxygen cylinder pressure is not displayed on the ECAM, the pressure can be read from the direct reading gage on the cylinder before each flight. The exterior oxygen overpressure indicator green disk may be missing or damaged but must be reinstalled within 10 days. One microphone must be operative for each pilot.

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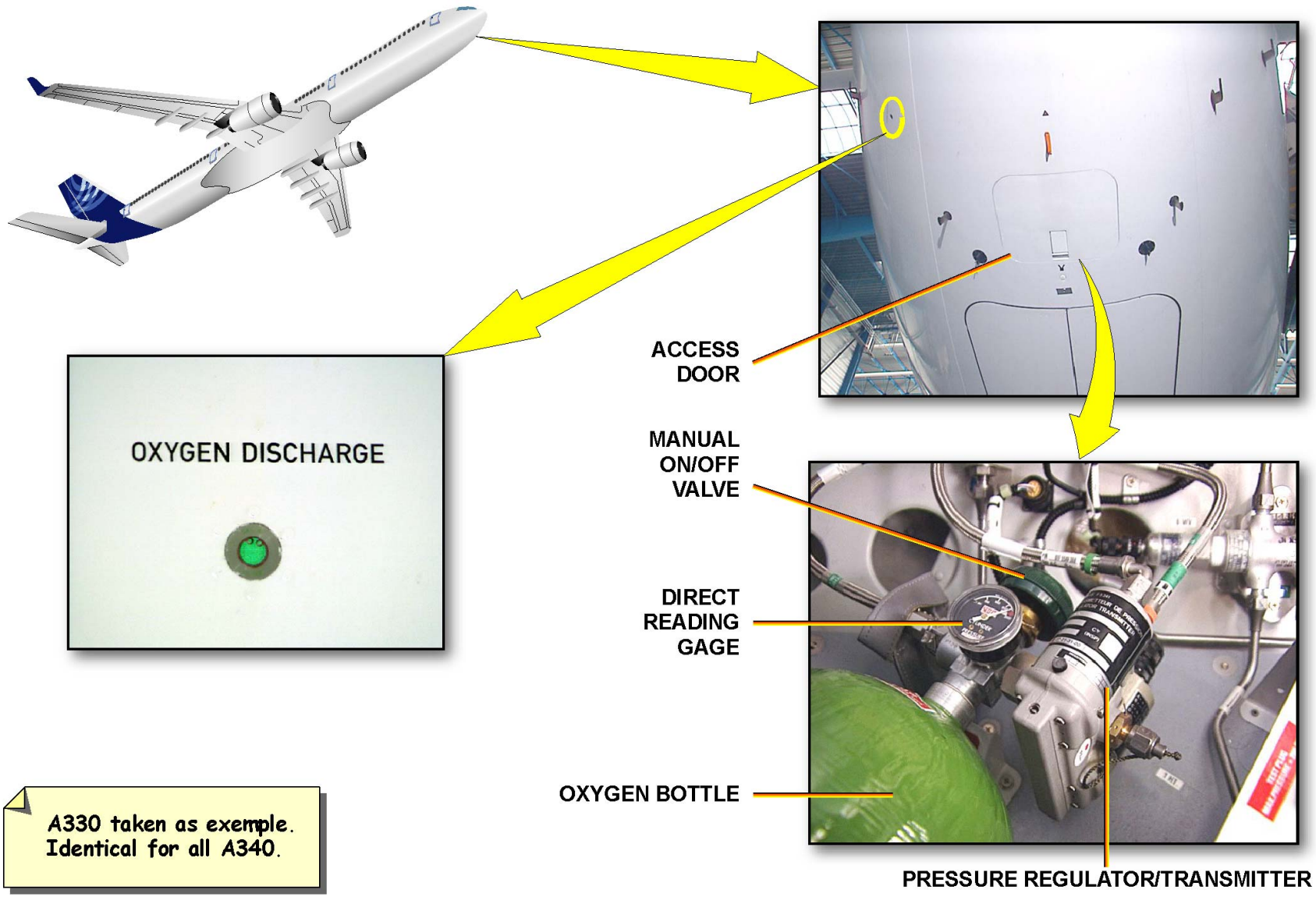

MEL/DEACTIVATION - CREW OXYGEN SYSTEM

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MEL/DEACTIVATION (continued)

PASSENGER OXYGEN SYSTEM

One or more Individual Oxygen Module in the Flight Crew Rest Compartment (FCRC) or in the Lower Deck Crew Rest Compartment (LDCRC) may be inoperative:
- the related bunk bed or seat is not occupied and is placarded inoperative or the related bunk bed or seat may be occupied,
- if the operating altitude is limited according to regulations or the related bunk bed or seat may be occupied,
- if a portable oxygen bottle and mask are available for the related bunk bed or seat occupant.

One or more cabin individual oxygen unit may be inoperative if the related seats are not occupied or the operating altitude is limited according to regulations. One or more lavatory oxygen units may be inoperative if the related lavatory is not used/occupied.
One or more galley oxygen units may be inoperative if the related galley is not used/occupied or operating altitude is limited according to regulations or a cabin attendant portable oxygen device is available.
The passenger oxygen manual control MASK MAN ON P/B may be inoperative if the operating altitude is limited according to regulations.
The passenger oxygen AUTO control may be inoperative if the operating altitude is limited to Flight Level (FL) 300.

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BUNKS AND SEAT LOWER DECK CREW REST

CHEMICAL GENERATOR

FLIGHT CREW REST COMPARTMENT

ABOVE PASSENGER SEAT

IN THE LAVATORIES

AT THE CABIN ATTENDANT STATIONS

MEL/DEACTIVATION - PASSENGER OXYGEN SYSTEM

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MEL/DEACTIVATION (continued)

PORTABLE OXYGEN SYSTEM

Some of the flight crew and cabin attendants portable devices may be inoperative according to regulations requirements.

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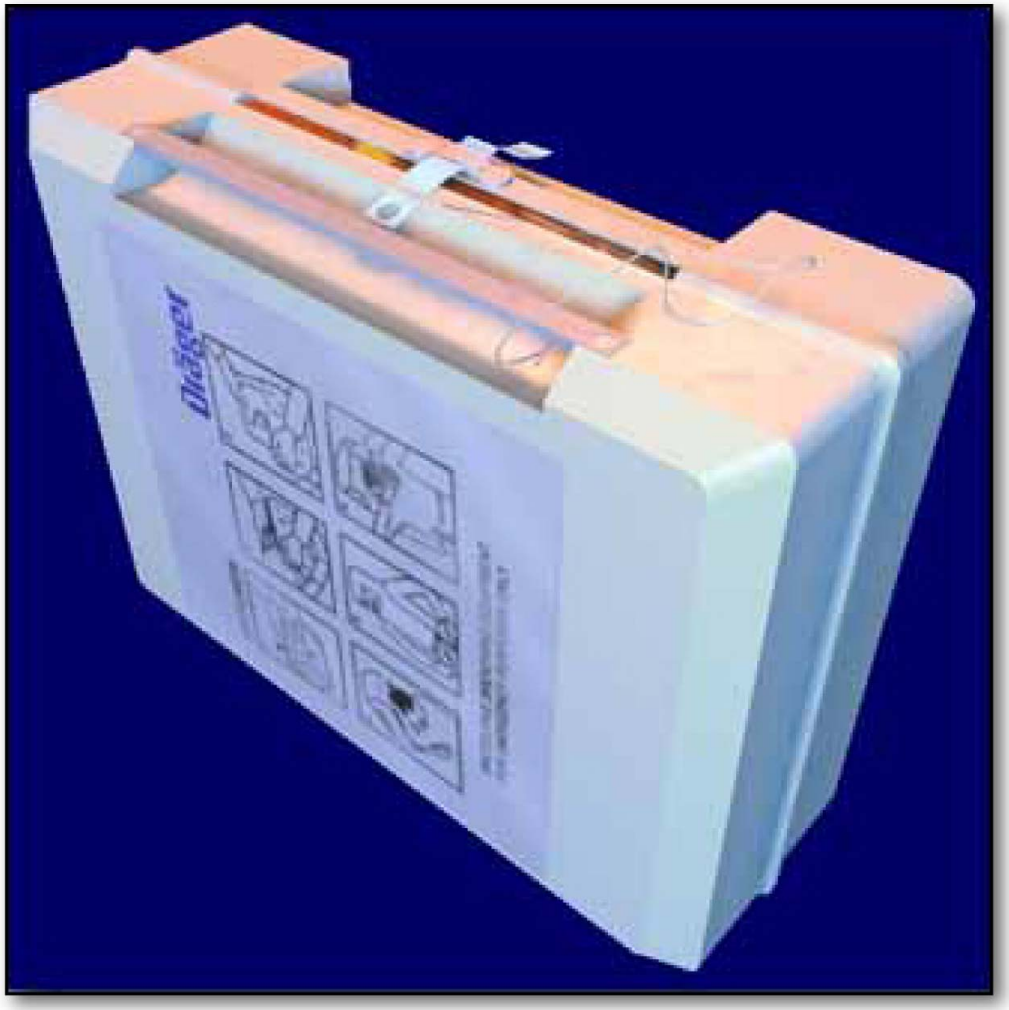

PROTECTIVE BREATHING EQUIPMENT (PBE)

MEL/DEACTIVATION - PORTABLE OXYGEN SYSTEM

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MAINTENANCE TIPS

VISUAL CHECK OF CHEMICAL OXYGEN GENERATOR FOR SIGNS OF DISCHARGE

Make sure that the condition is white. If the condition is black, replace the chemical generator.

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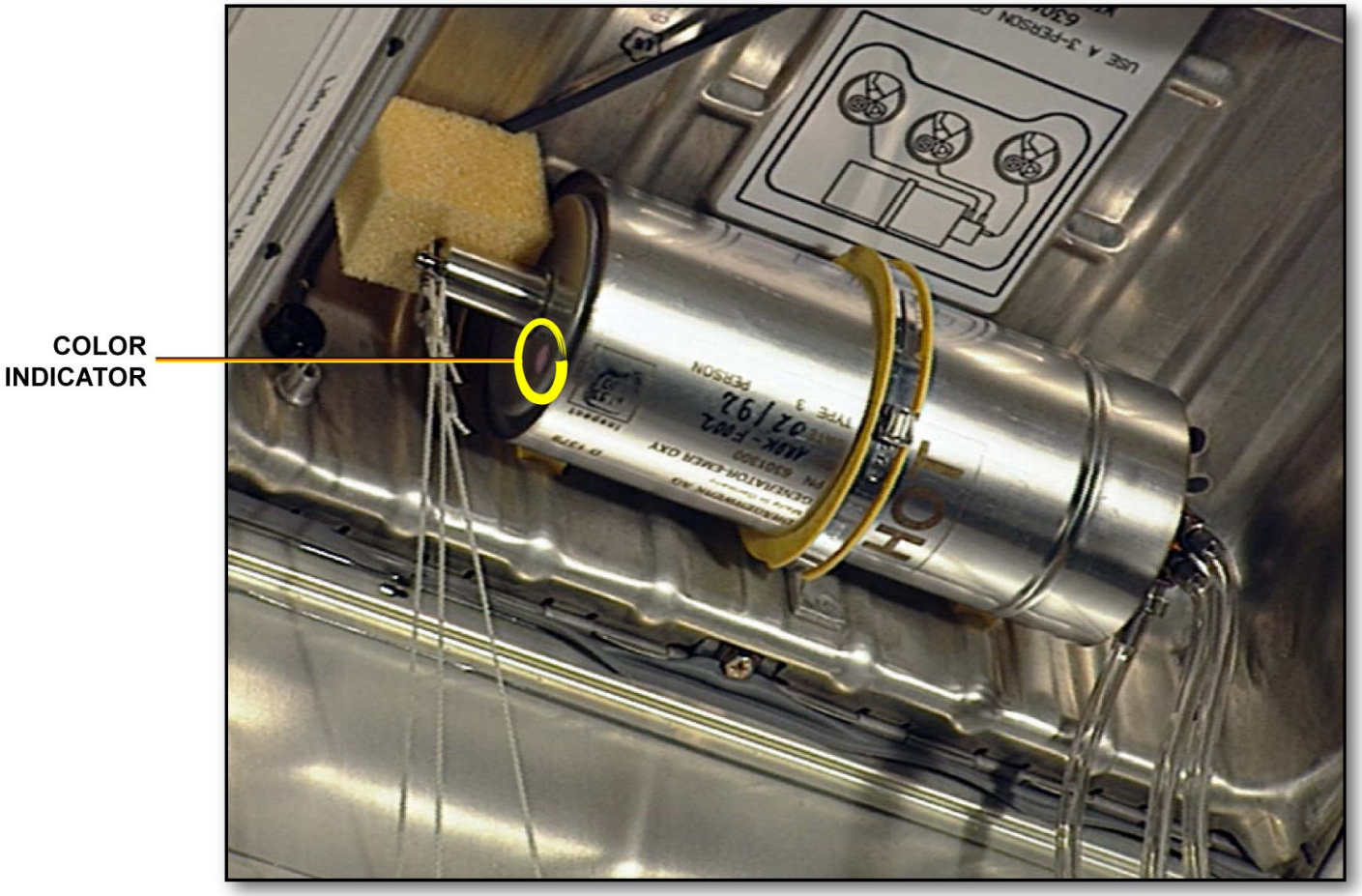

CHEMICAL GENERATOR

MAINTENANCE TIPS - VISUAL CHECK OF CHEMICAL OXYGEN GENERATOR FOR SIGNS OF DISCHARGE

OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MAINTENANCE TIPS (continued)

CREW OXYGEN MASK STOWING

Proper stowing of the mask is essential for quick and efficient donning of the mask.
Open the stowage box flap doors and install the flexible hose correctly.
Engage the mask assembly with the regulator on top.
Close the left flap door carefully while pushing the reset test slider to retract the OXY ON flag.
At the end of the re-stowing operation, do the in situ test.
Push the PRESS TO TEST AND RESET button, the blinker turns yellow and goes back to black again showing that the regulator is leak tight.
Press the harness inflation control, the blinker turns yellow and goes back to black again showing that the harness is leak tight.
The emergency rotation knob is pressed for the test of the on demand system.
The microphone is tested by activating the loudspeakers, the interphone, and by pressing the emergency rotation knob.
When the tests are completed, make sure that the N/100% selector is locked in the 100% position, and the PRESS TO TEST AND RESET button returns to the up position.

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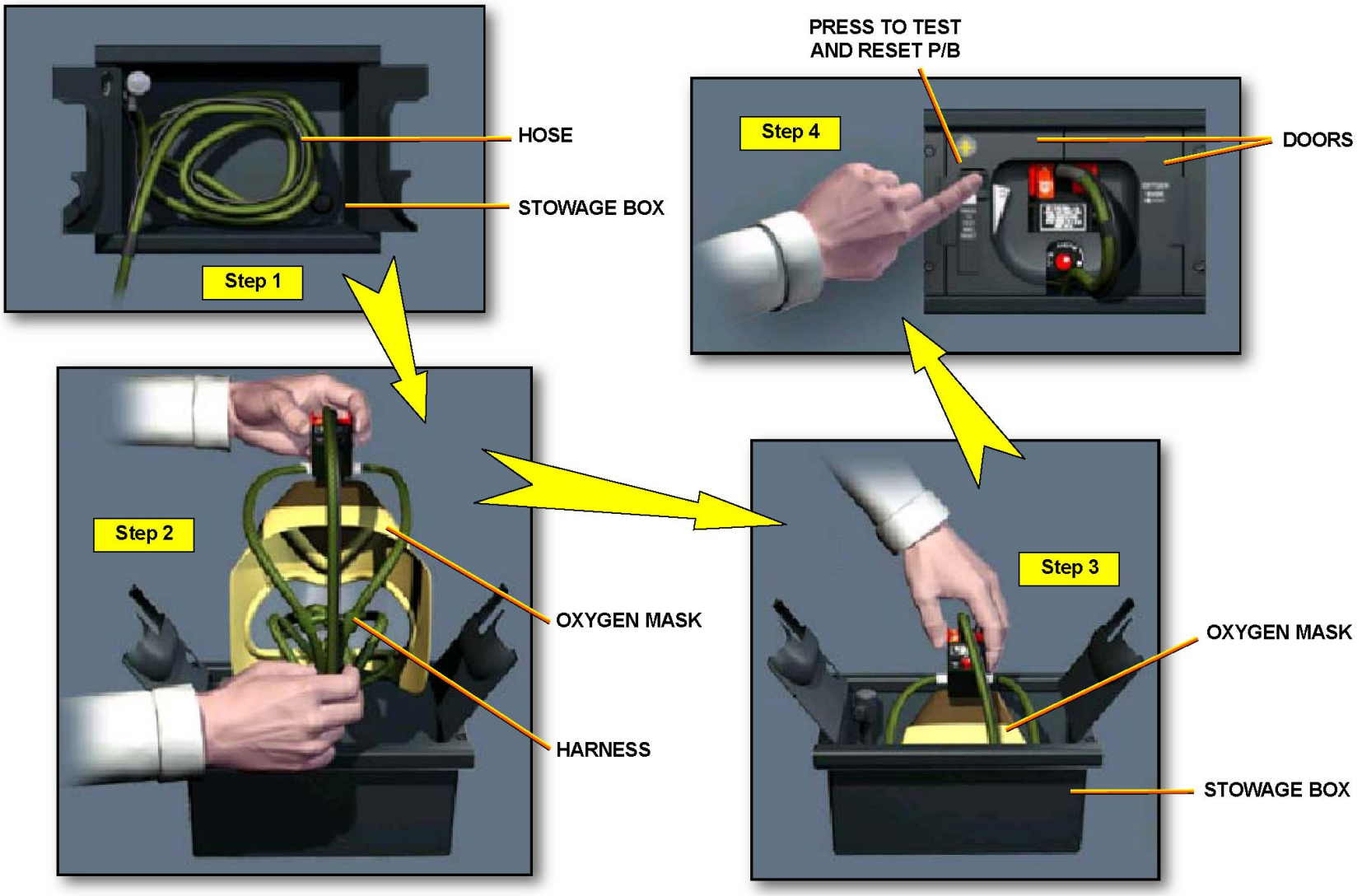

MAINTENANCE TIPS - CREW OXYGEN MASK STOWING

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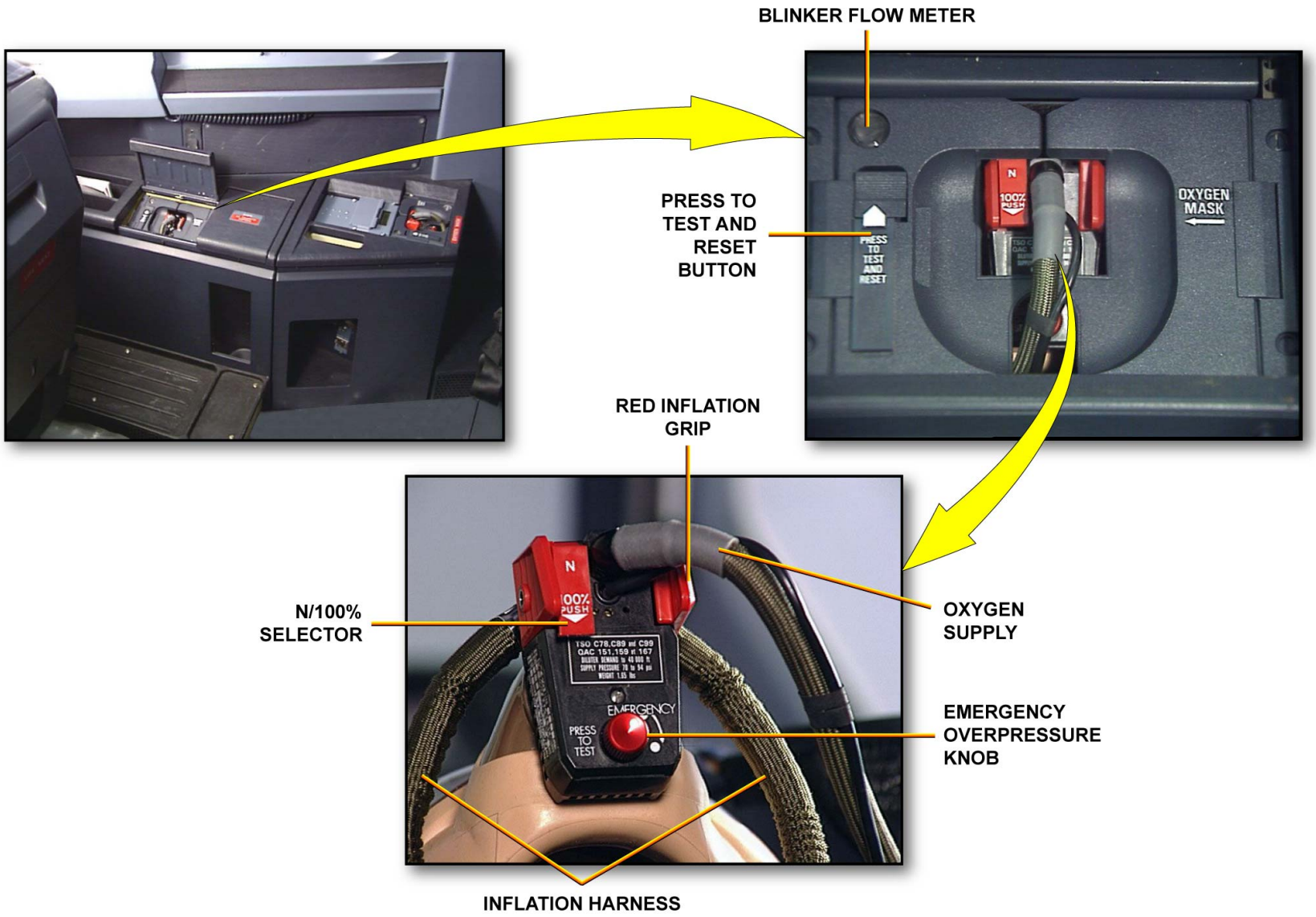

MAINTENANCE TIPS - CREW OXYGEN MASK STOWING

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MAINTENANCE TIPS (continued)

REPLACEMENT OF THE OVERBOARD DISCHARGE INDICATOR

Before to install a new overboard discharge indicator, on the aircraft skin remove the yellow reflecting washer from the body of the indicator and discard it and clean the body of the indicator with a clean lint-free cloth. The new components of the overboard discharge indicator are provided in a replacement kit. Install the components as shown on the picture:
o washer,
o new disc with the green reflecting surface on the external side,
o clip with the rounded edges on the external side.

NOTE: NOTE: Incorrect clip installation may lead to overboard discharge indicator falling down at aircraft touch down.

CAUTION: MAKE SURE THAT NO UNWANTED PARTICLES GO INTO THE OXYGEN SYSTEM. PARTICLES IN THE OXYGEN SYSTEM CAN CAUSE A BLOCKAGE AND DAMAGE TO THE AIRCRAFT.

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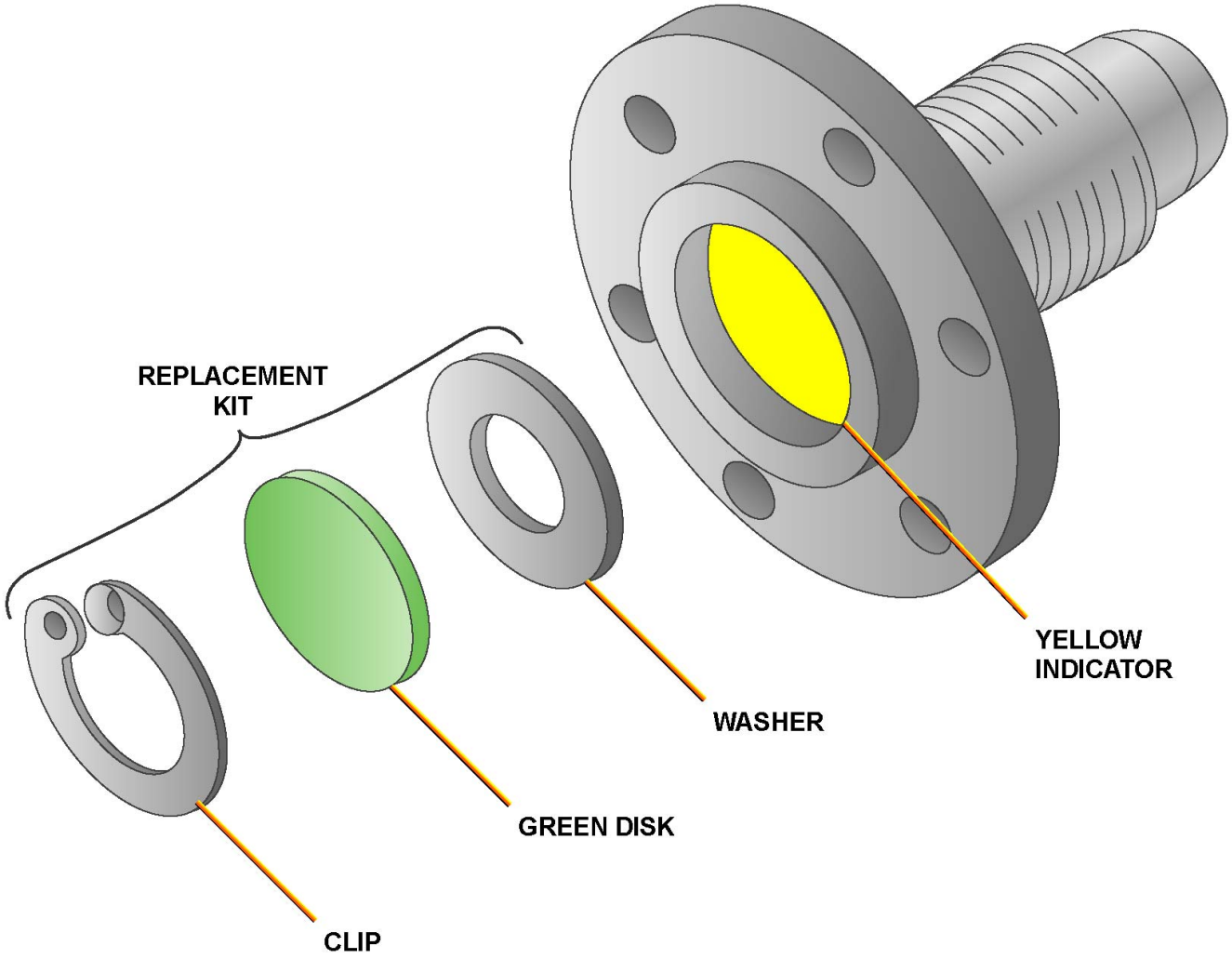

MAINTENANCE TIPS - REPLACEMENT OF THE OVERBOARD DISCHARGE INDICATOR

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OXYGEN SYSTEM LINE MAINTENANCE BRIEFING (2)

MAINTENANCE TIPS (continued)

PACKING OF THE OXYGEN MASK ASSEMBLIES

WARNING: CLEAN THE TOOLS AND MAKE SURE YOUR HANDS ARE CLEAN TO PREVENT CONTAMINATION OF THE OXYGEN SYSTEM. MAKE SURE THAT THE OXYGEN MASKS ARE PACKED CORRECTLY. IF NOT, IT IS POSSIBLE THAT THEY WILL NOT FALL OUT CORRECTLY IN AN EMERGENCY SITUATION.

Fold the reservoir bag in three and put it with the headband in the oxygen mask.

Wind the supply hose and place it into the oxygen mask. Make sure that the supply hose is not twisted.

Continue to wind the hose into the oxygen mask, lifting the mask into the emergency-oxygen container.

Make sure that the supply hoses are connected to the generator outlet and that the lanyards are connected to the actuator pin.

Put the lanyards inside the oxygen masks, making sure that they do not tangle up or any part gets caught in the container.

If no other oxygen system servicing tasks have to be completed, the emergency-oxygen container can be closed, making sure that all tools used during this procedure have been removed.

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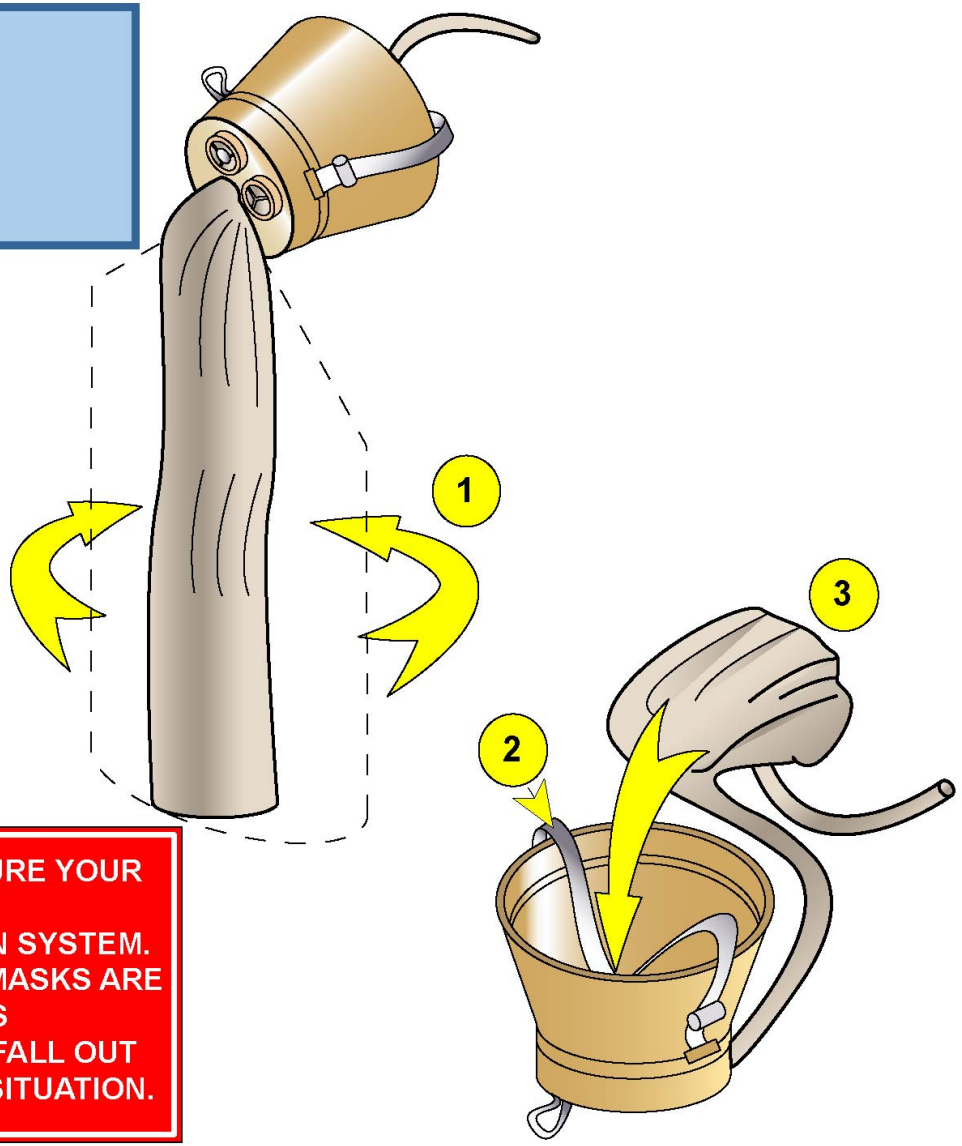
Do the packing of the oxygen mask as follows:
(1)Fold the reservoir bag in three.
(2)Put the headband into the oxygen mask.
(3)Put the reservoir bag into the oxygen mask.

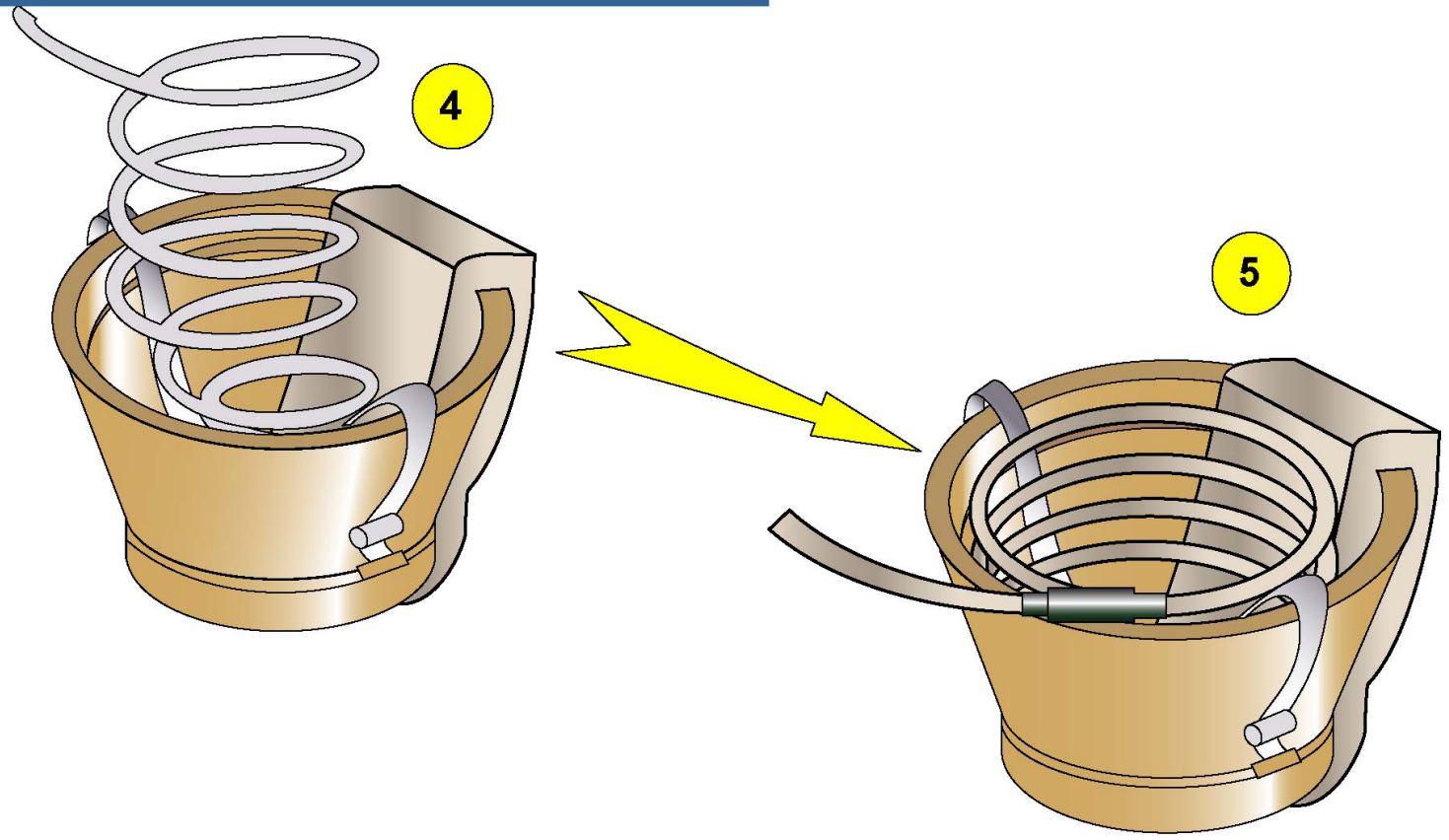


WARNING

CLEAN THE TOOLS AND MAKE SURE YOUR HANDS ARE CLEAN TO PREVENT CONTAMINATION OF THE OXYGEN SYSTEM. MAKE SURE THAT THE OXYGEN MASKS ARE PACKED CORRECTLY. IF NOT, IT IS POSSIBLE THAT THEY WILL NOT FALL OUT CORRECTLY IN AN EMERGENCY SITUATION.

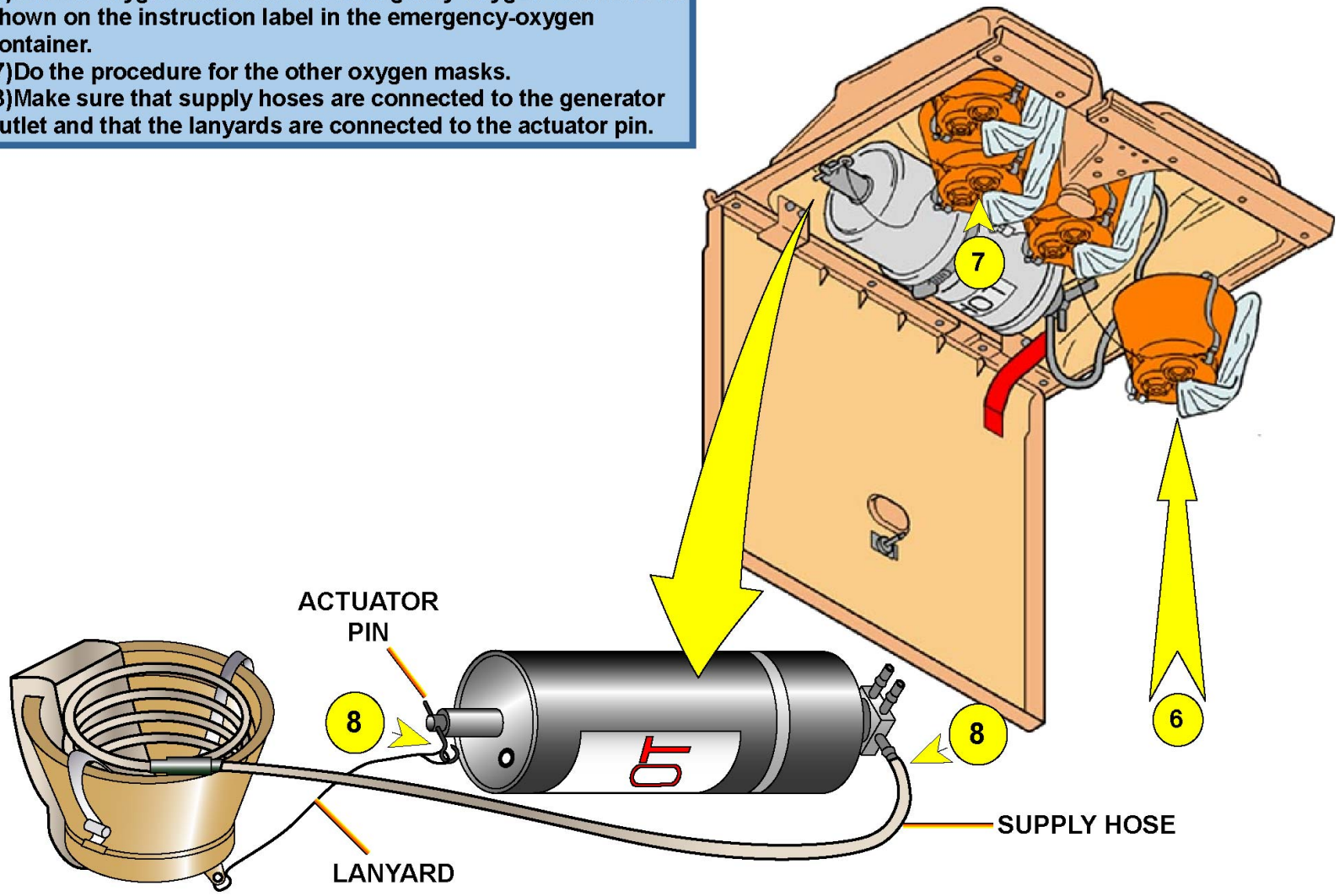
MAINTENANCE TIPS - PACKING OF THE OXYGEN MASK ASSEMBLIES

(4)Wind the supply hose and make sure that it is not twisted.
(5)Put the supply hose into the oxygen mask.



MAINTENANCE TIPS - PACKING OF THE OXYGEN MASK ASSEMBLIES

(6)Put the oxygen mask into the emergency-oxygen container as shown on the instruction label in the emergency-oxygen container.
(7)Do the procedure for the other oxygen masks.
(8)Make sure that supply hoses are connected to the generator outlet and that the lanyards are connected to the actuator pin.



MAINTENANCE TIPS - PACKING OF THE OXYGEN MASK ASSEMBLIES

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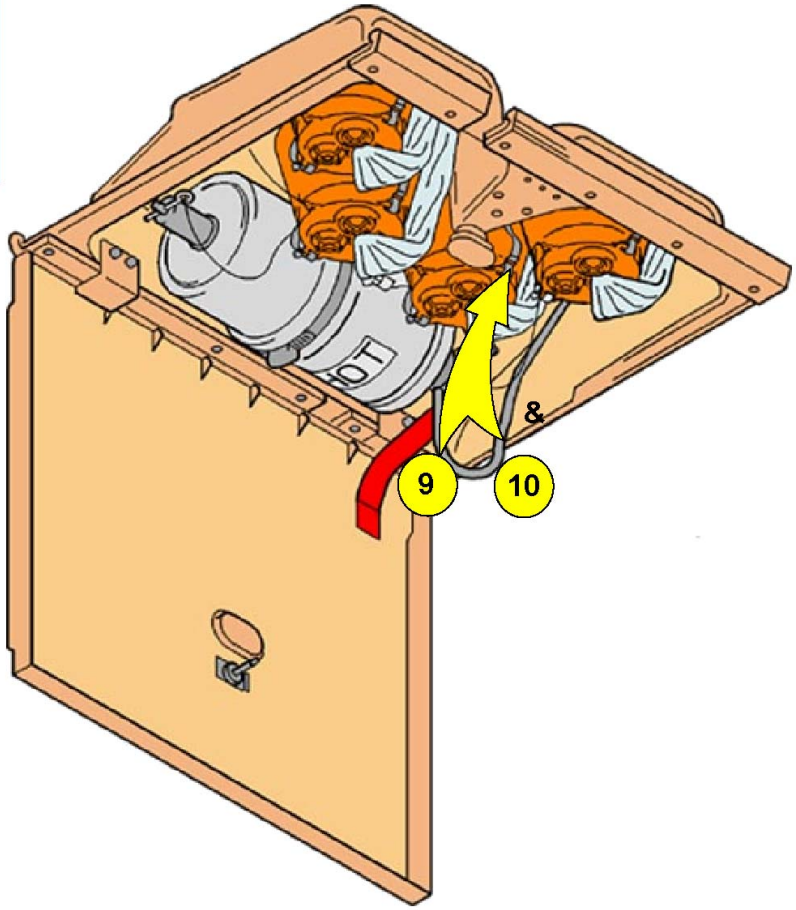
(9)Put the supply hoses on the oxygen masks. Make sure that the supply hoses do not tangle up or any part gets caught in the emergency- oxygen container.
(10)Put the lanyards on the oxygen masks. Make sure that the supply hoses do not tangle up or any part gets caught in the emergency- oxygen container.



MAINTENANCE TIPS - PACKING OF THE OXYGEN MASK ASSEMBLIES

Close the door of the emergency-oxygen container

MAINTENANCE TIPS - PACKING OF THE OXYGEN MASK ASSEMBLIES

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Oxygen Properties

The air is made of 21% oxygen, 78% nitrogen and 1% other gases.
The gaseous oxygen is colorless, odorless and tasteless.
The gaseous oxygen is not flammable, but supports combustion.
The gaseous oxygen is heavier than air and can accumulate in low lying areas.
The oxygen reacts to most metals and organic material.
The reactivity varies with the type of material:
- The reaction can be slow and can cause for example steel oxidation commonly called rust,
- The reaction can be fast when the oxygen is in contact with petroleum product, and can cause fire or explosion.

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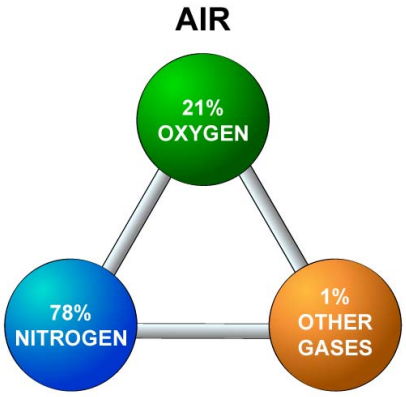

EXAMPLE OF OXYGEN INCIDENT

OXYGEN :

I am invisible ... !

I am silent ... !

I have no smell ... !

I help to burn very quickly ... !

OXYGEN PROPERTIES

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Aircraft Oxygen Systems

At high altitude, the pressurization (ATA 21) system maintains a sufficient air pressure, thus oxygen partial pressure, in the aircraft.
In case of aircraft depressurization the oxygen systems (ATA35) supply sufficient oxygen partial pressure to the crew and passengers until the aircraft gets at lower altitude (10000ft).
A lot of those systems use bottle of highly pressurized oxygen.

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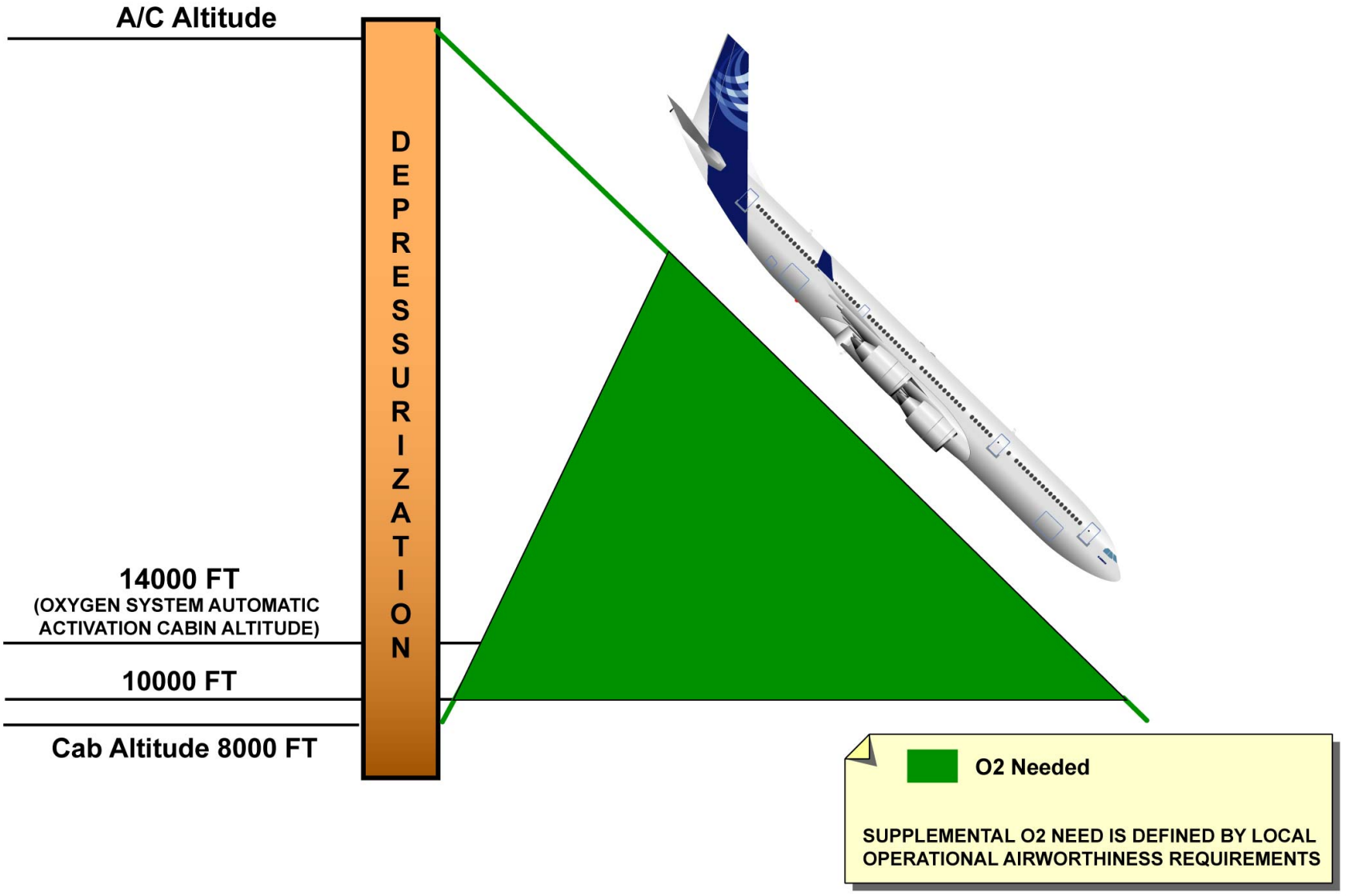

AIRCRAFT OXYGEN SYSTEMS

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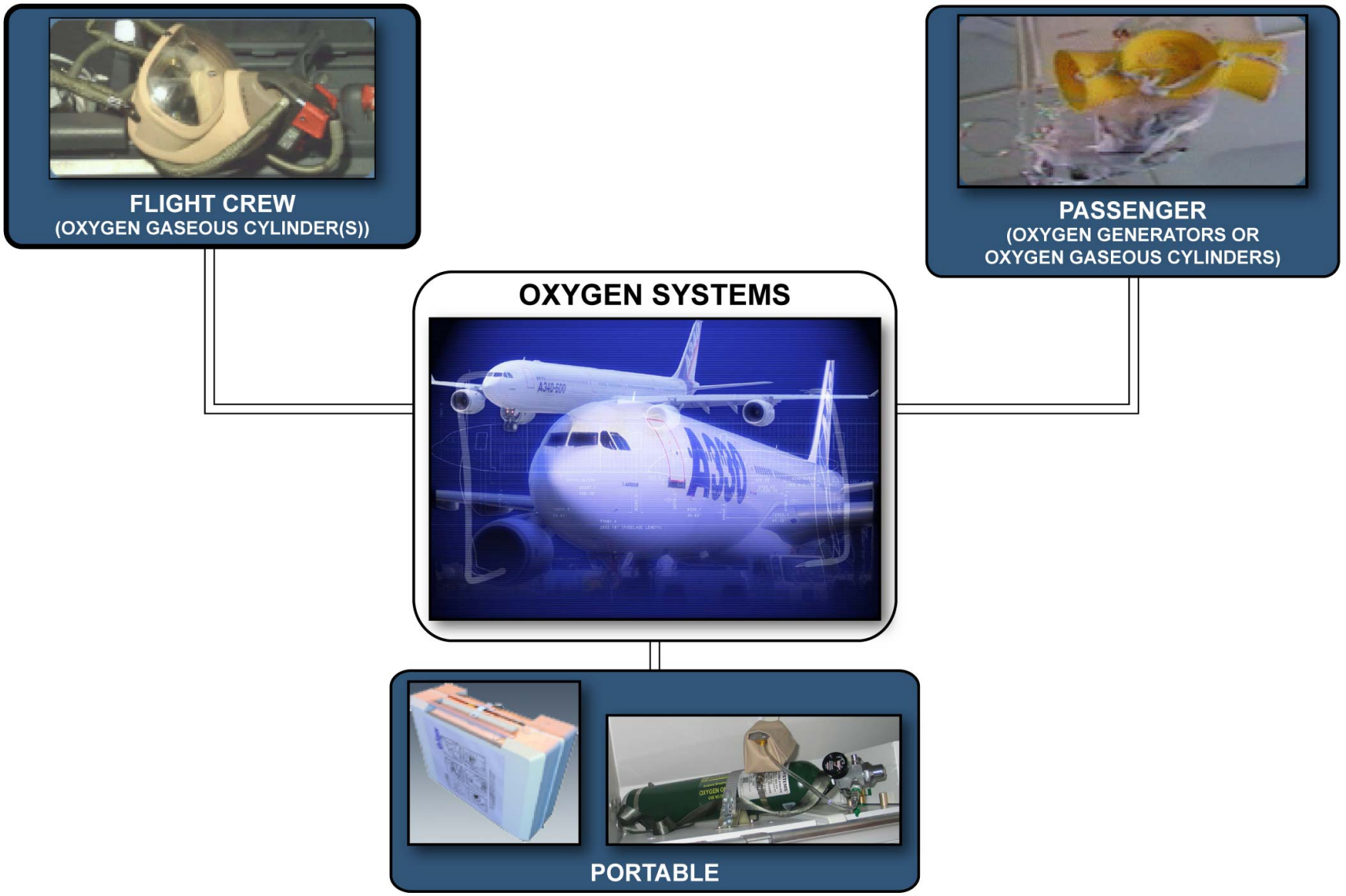

AIRCRAFT OXYGEN SYSTEMS

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

The Fire Triangle

If one of these elements is missing, no fire / explosion can occur:
- Oxygen,
- Combustible material and,
- An ignition source,

are put together, fire can start and keep on going.

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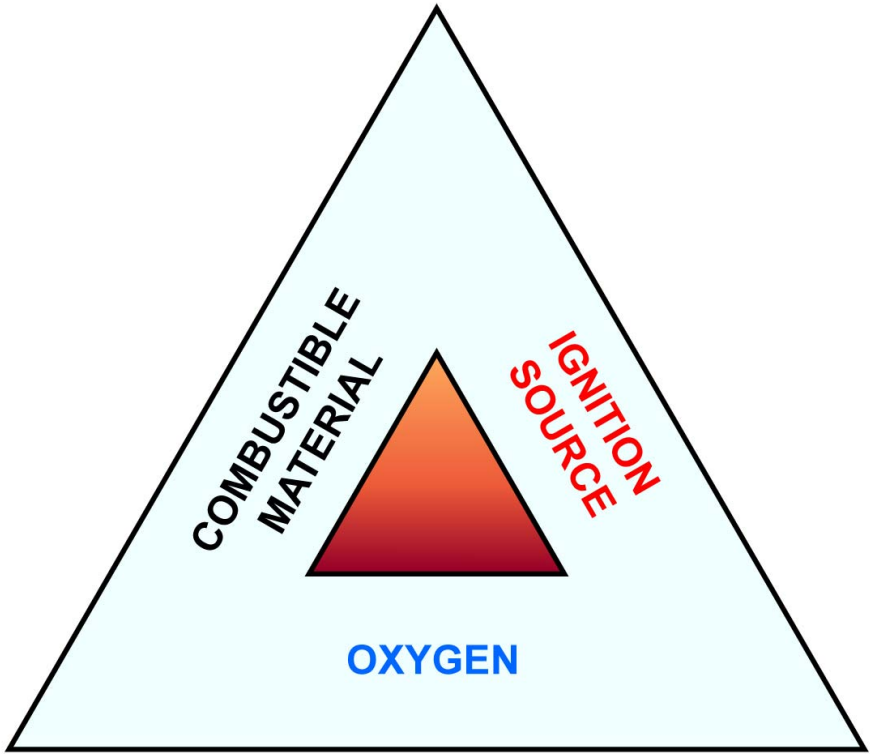

FIRE TRIANGLE

THE FIRE TRIANGLE

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

The Fire Triangle (continued)

Ignition Sources

The ignition sources are (examples):
- Raw flame (from cigarettes),
- Incandescent particles (from grinding during structure repairing...),
- Electrical overheating (from electrical engines, bad contact),
- Electrical discharge (static electricity, short circuit, mobile-phone operation, lightning during thunderstorm...),
- Oxygen overheating due to either too high pressure or, quick opening or closure of oxygen valves (sudden pressurization) or impact on the oxygen bottle (molecules agitation),
- Traces of hydrocarbon (petroleum product) mixed with pure oxygen.

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IGNITION SOURCES

RAW FLAME (FROM CIGARETTES)

INCANDESCENT PARTICLES

ELECTRICAL OVERHEATING

ELECTRICAL DISCHARGE

QUICK OPENING = OXYGEN OVERHEATING

TRACES OF HYDROCARBON

THE FIRE TRIANGLE - IGNITION SOURCES

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

The Fire Triangle (continued)

Oxygen Enriched Atmosphere

An atmosphere is considered as an oxygen-enriched atmosphere when the oxygen percentage is 24% and above.
In comparison to a fire in the air, a fire in an oxygen-enriched atmosphere will be characterized by:
- High in intensity,
- Higher in temperature and,
- Higher in thermal power.

Pure oxygen at high pressure will react violently with materials such as oil, grease, textiles and rubber, and will get powerfully in fire.
In most cases, a fire that occurs in an atmosphere full of oxygen cannot be extinguished as long as the cause of fire has not been isolated.

First Aid

Persons getting on fire in an atmosphere full of oxygen cannot get help directly by a person entering the area. The rescuer takes also the risk to get on fire.
The victim must be sprayed of water and carried outside in free air as soon as possible.
The first aid care must be applied immediately and if possible in a specialized care unit for badly burned person.

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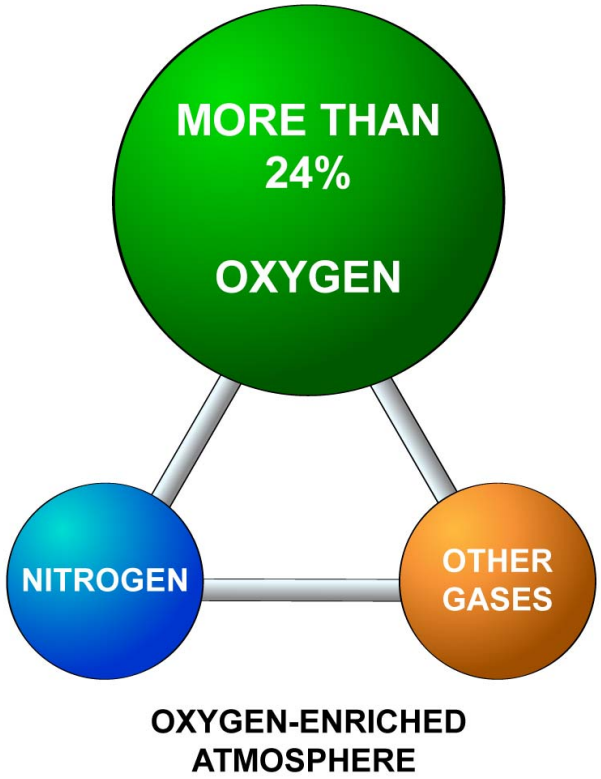

THE FIRE TRIANGLE - OXYGEN ENRICHED ATMOSPHERE & FIRST AID

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

The Fire Triangle (continued)

Dangers linked to Pressurized Gas

The oxygen is stowed in cylinders at very high-pressure: 1850psi at 21°C, 130kg/cm^2. Such a high pressure is potentially dangerous.
Any crack in the pressure wall of pressurized gas system causes a violent eruption of gas through the crack. The result can be a high or even violent explosion.
For example, if a valve brakes off a high-pressure cylinder, the container becomes an unguided missile.
That is the reason why the oxygen cylinders and pressure reducers must be tested at regular intervals (hydrostatic test every 3 - 5 years depending on applicable standard / special permit).

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DANGERS LINKED TO PRESSURIZED GAS

THE FIRE TRIANGLE - DANGERS LINKED TO PRESSURIZED GAS

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Leak In Confined Area

In Flight the stowage compartments of oxygen bottle are naturally ventilated through the cabin ventilation system (air flow from DADO panel to outflow valve).
On the ground, when the aircraft is parked not powered (dead aircraft), these ventilations are not effective any more.
The oxygen bottle and the distribution lines are installed in confined area.
In the case of oxygen leak, the percentage of oxygen in the air will be higher.

Oxygen Detector

The oxygen enrichment is not detected by human senses.
An oxygen detector can be used before to get inside an area filled of oxygen.
If there is too high oxygen concentration in this area, do not go into this area and ventilate.

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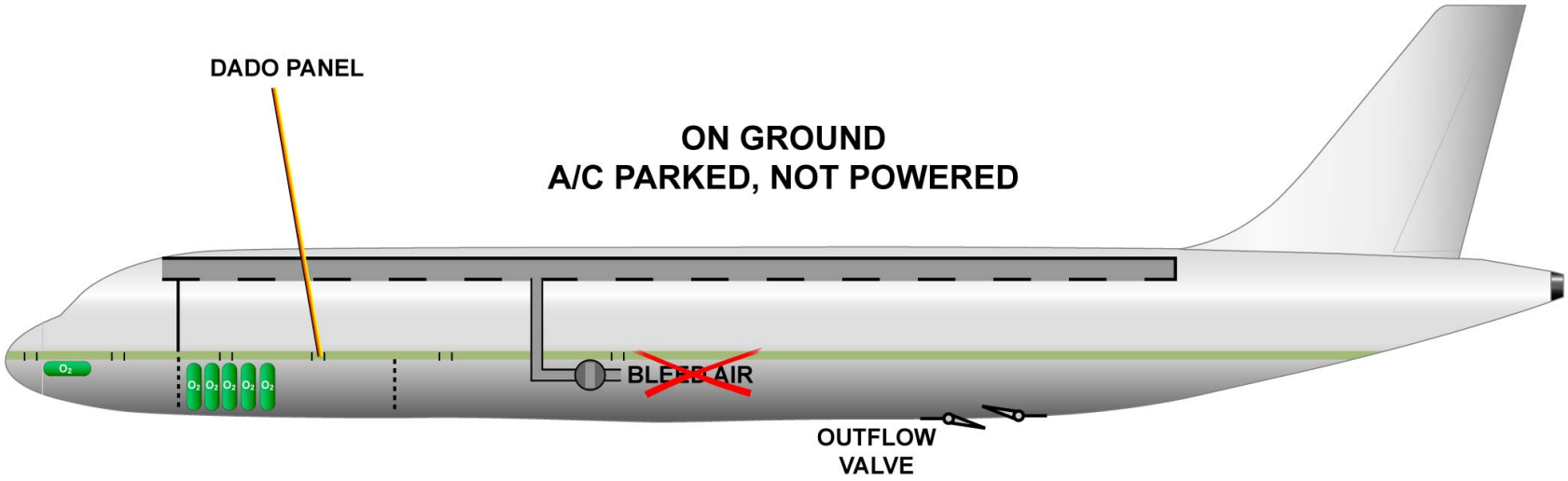
EXAMPLE OF OXYGEN DETECTOR



LEAK IN CONFINED AREA - OXYGEN DETECTOR

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Leak In Confined Area (continued)

Clothes, Skin and Equipment

Clothing, skin and equipment must be free of oil or grease.
Clothes and hair tend to absorb oxygen. Consequently, a person in an area where the air is filled with oxygen will keep a high concentration of oxygen. This oxygen stays on for some time. This person must avoid any source of ignition for 15 minutes, smoking for example.

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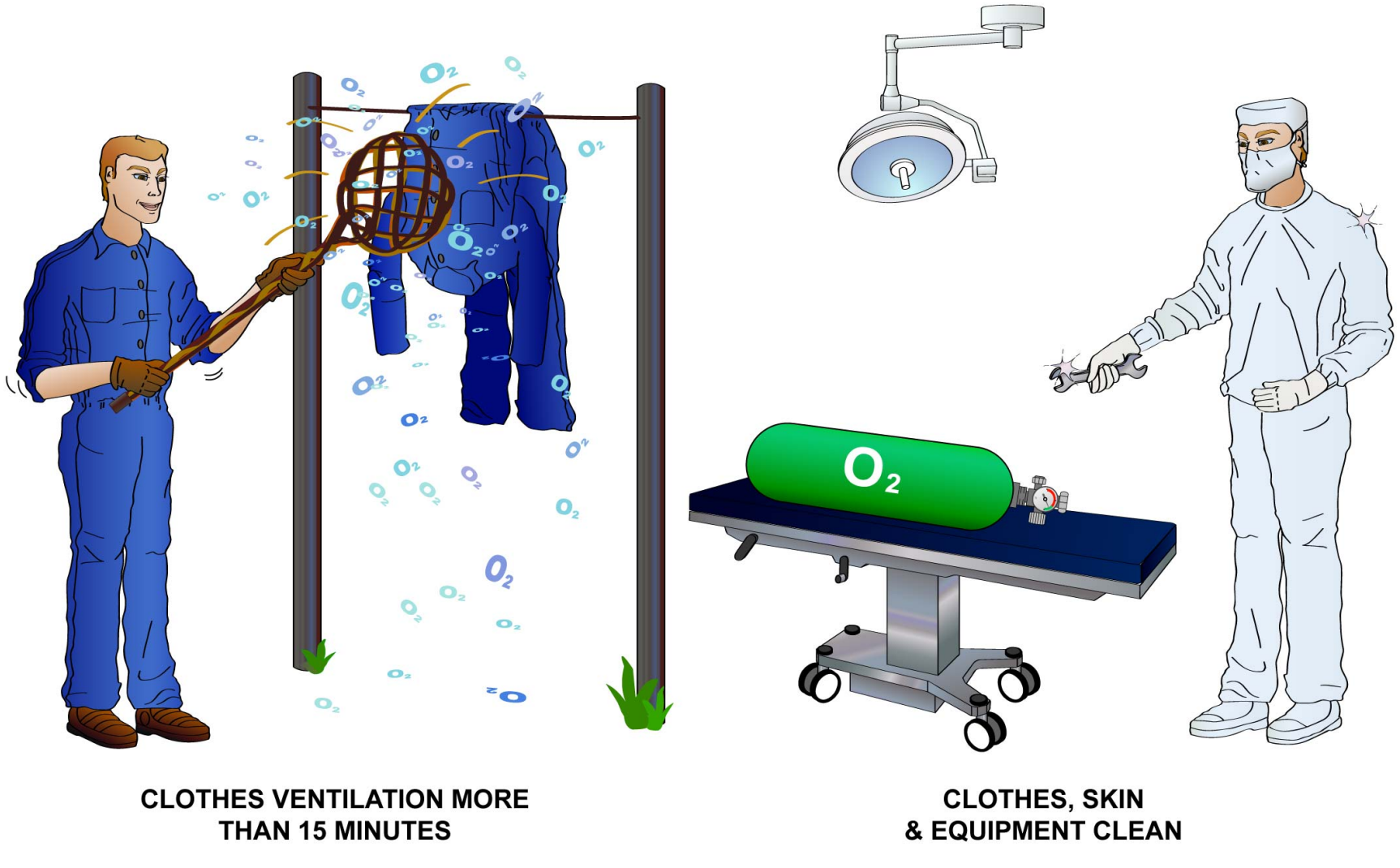

LEAK IN CONFINED AREA - CLOTHES, SKIN AND EQUIPMENT

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Leak In Confined Area (continued)

Hyperventilation Caused by Too Much Oxygen

A person who works in an area filled of oxygen may suffer from hyperventilation.
Hyperventilation can cause the following symptoms:
- Feeling of dizziness, coldness,
- Tingling in the hands, feet and around the lips,
- Nausea.

In such a case, help the colleague to leave the confined zone. Give him the instruction to breathe slower and the symptoms should disappear.

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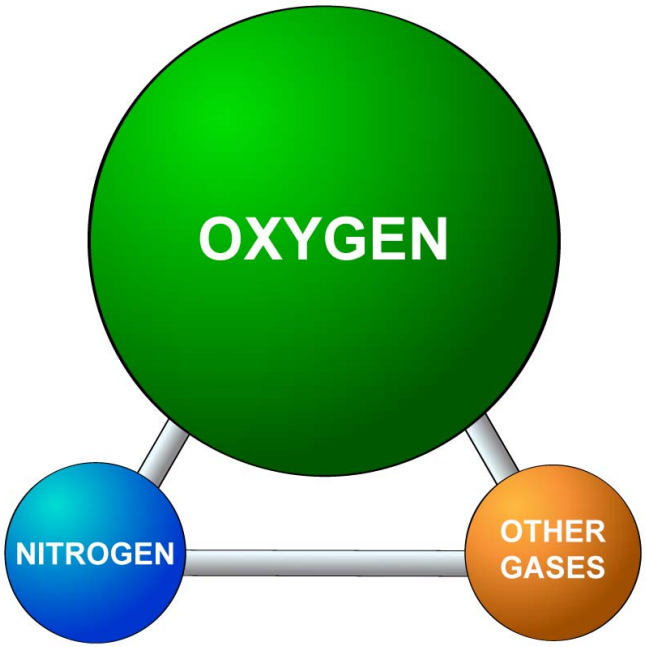

OXYGEN-ENRICHED ATMOSPHERE

LEAK IN CONFINED AREA - HYPERVENTILATION CAUSED BY TOO MUCH OXYGEN

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Safety Precautions

Make sure that you use the correct Airbus documentations corresponding to the aircraft (task in AMM, PN in IPC, SB...). Carefully obey the maintenance procedure instructions. If you do not obey these instructions, you can cause a fire or an explosion.
Prevent all maintenance procedures nearer than 5m (16.4ft) from the working area of the aircraft.
Stop all refueling, and all repairs on fuel and hydraulic systems.
Stop all procedures that use flammable material such as cleaning and de-icing material.
Stop all operations that cause heat and flame (For example: drilling holes...).

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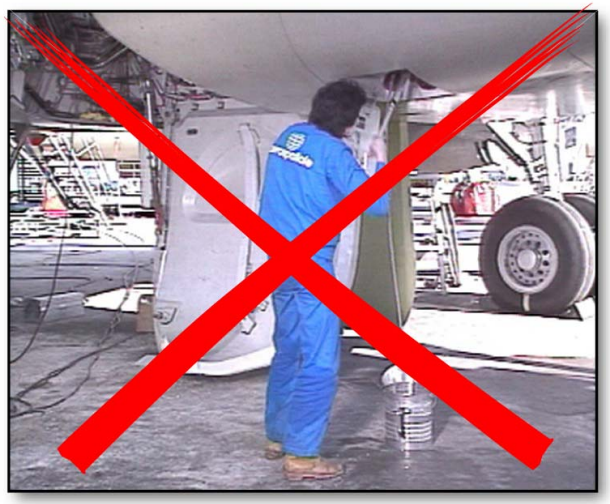
STOP REFUELING

STOP HYDRAULIC SERVICING



STOP DE-ICING

STOP OPERATIONS CAUSING HEAT & FLAME

SAFETY PRECAUTIONS

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Safety Precautions (continued)

During Oxygen Servicing

Put a warning notice in the cockpit, the work area and the cabin to tell persons not to operate electrical switches during the oxygen filling procedure.
Electrostatically ground the aircraft and also electrostatically bond the oxygen charging equipment to the aircraft.
If a thunderstorm can occur, immediately stop all oxygen filling operations.
Stop the filling procedure immediately if the pressures in each oxygen cylinder do not increase smoothly and at the same time. Only use aviator's breathing oxygen as defined by Airbus.
Keep all hydrocarbons (fuels, corrosion protection compounds, lubricants, etc.) away from all sources of oxygen. Oxygen becomes explosive when it touches hydrocarbons.
Open the hand-valves of the oxygen cylinder very slowly and turn them to the fully open position. In the case the hand-valves are not fully open before flight, the data of the oxygen pressure on the corresponding ECAM page will not be correct.

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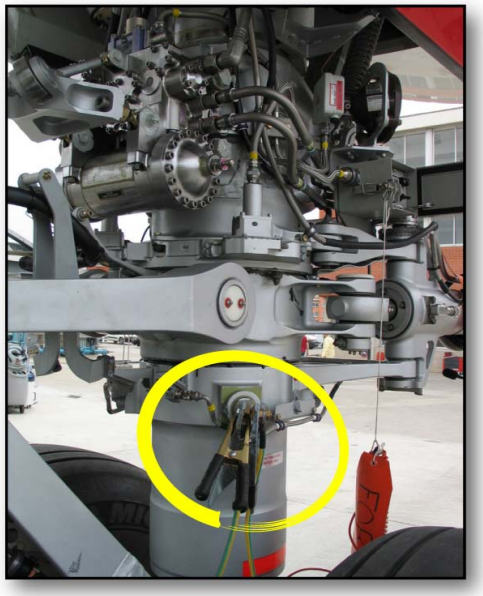
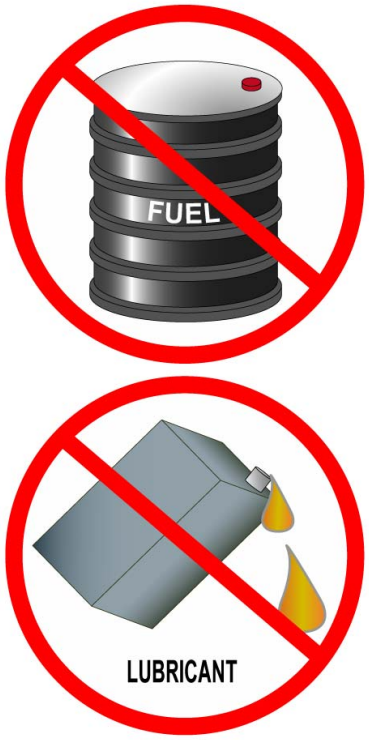
OXYGEN SERVICING EQUIPMENT



ELECTROSTATICALLY GROUND THE AIRCRAFT

STOP OXYGEN SERVICING IF THUNDERSTORM

SAFETY PRECAUTIONS - DURING OXYGEN SERVICING



VERY SLOWLY OPENING

SAFETY PRECAUTIONS - DURING OXYGEN SERVICING

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Safety Precautions (continued)

Oxygen Components Removal and Installation

Make sure that the ground support equipment is approved for the oxygen system. Equipment that is not approved can cause contamination of the system and injury.
Always work with clean clothes and tools. Keep your hands clean (possibly, wear gloves in cotton). Do not touch connection ends and interior of oxygen components with bare hands, because skin oil and bacteria are a source of contamination.
The area around the oxygen components must always be cleaned with approved cleaner before and after any work done on the system. Any tool, rag, cloth, or equipment that is not clean and free of oil traces must not be used or stay in the area around the oxygen components.
Make sure that all oxygen cylinder valves are closed. Due to possible residual pressure in the line, disconnect the connectors carefully.
Put dry, clean, metal or plastic plugs on all pipes or units removed temporarily. Put each pipe or unit in a sealed vinyl bag. Unwanted material in the oxygen system could damage the system or cause explosion if oil ingress.

WARNING: NEVER USE STANDARD OIL TO LUBRICATE THE CONNECTOR THREAD (risk of explosion).
ONLY LUBRICANTS and thread compounds SPECIFICALLY APPROVED FOR OXYGEN must be used.
Some unit/assembly are heavy.
Support the unit/assembly carefully to prevent injury to persons and damage.
During disconnection/reconnection of an oxygen line connector use two wrenches: one for the nut and one for the counter nut to avoid force onto the material (risk of rupture and leakage).
Make sure that the flexible hoses are not twisted or pulled tight. If the hoses are twisted or pulled tight the connections will break and cause a leak.
Torque the connection at the right value given by the maintenance manual.
Open and close the spring-loaded clamps carefully to prevent damage to the electrical harness near the oxygen cylinders.

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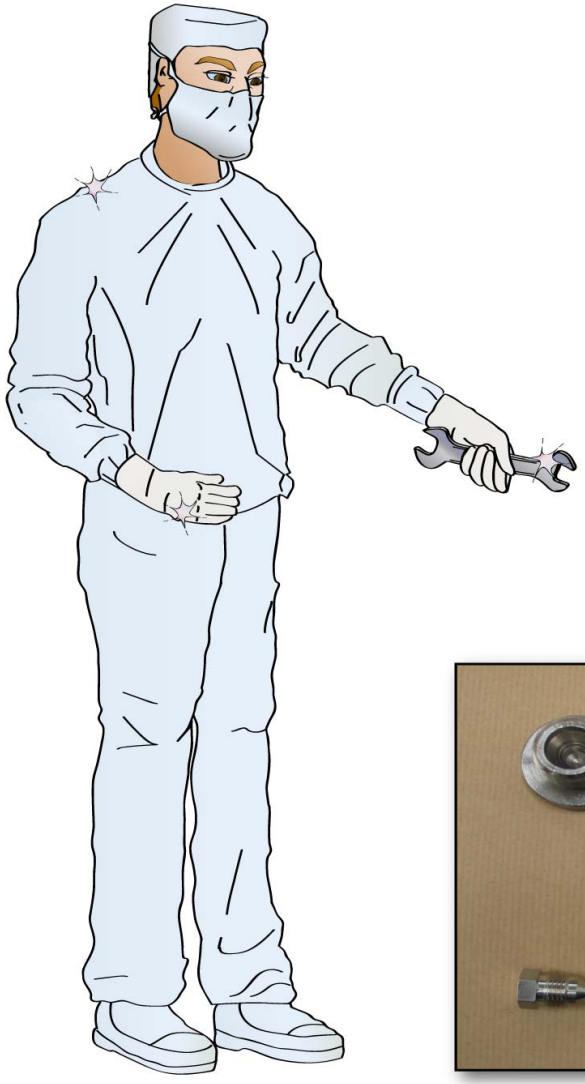


USE CLEAN PLUG

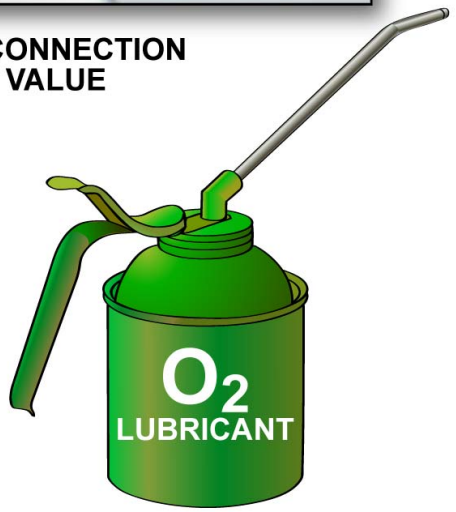
PUT EACH PIPE IN A SEALED VINYL BAG

SAFETY PRECAUTIONS - OXYGEN COMPONENTS REMOVAL AND INSTALLATION

WARNING

NEVER USE STANDARD OIL TO LUBRICATE THE CONNECTOR THREAD (RISK OF EXPLOSION).

TORQUE THE CONNECTION AT RIGHT VALUE



SAFETY PRECAUTIONS - OXYGEN COMPONENTS REMOVAL AND INSTALLATION

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Safety Precautions (continued)

Leak Detection

Make sure that the leak detector product and test equipment are approved for the oxygen system.
Equipment or products that are not approved can cause contamination of the system and injury to personnel (fire, explosion).
Make sure that the items in the "fixtures, tools, and test and support equipment" paragraph are applicable to your aircraft. Refer to the applicable task and subtasks.

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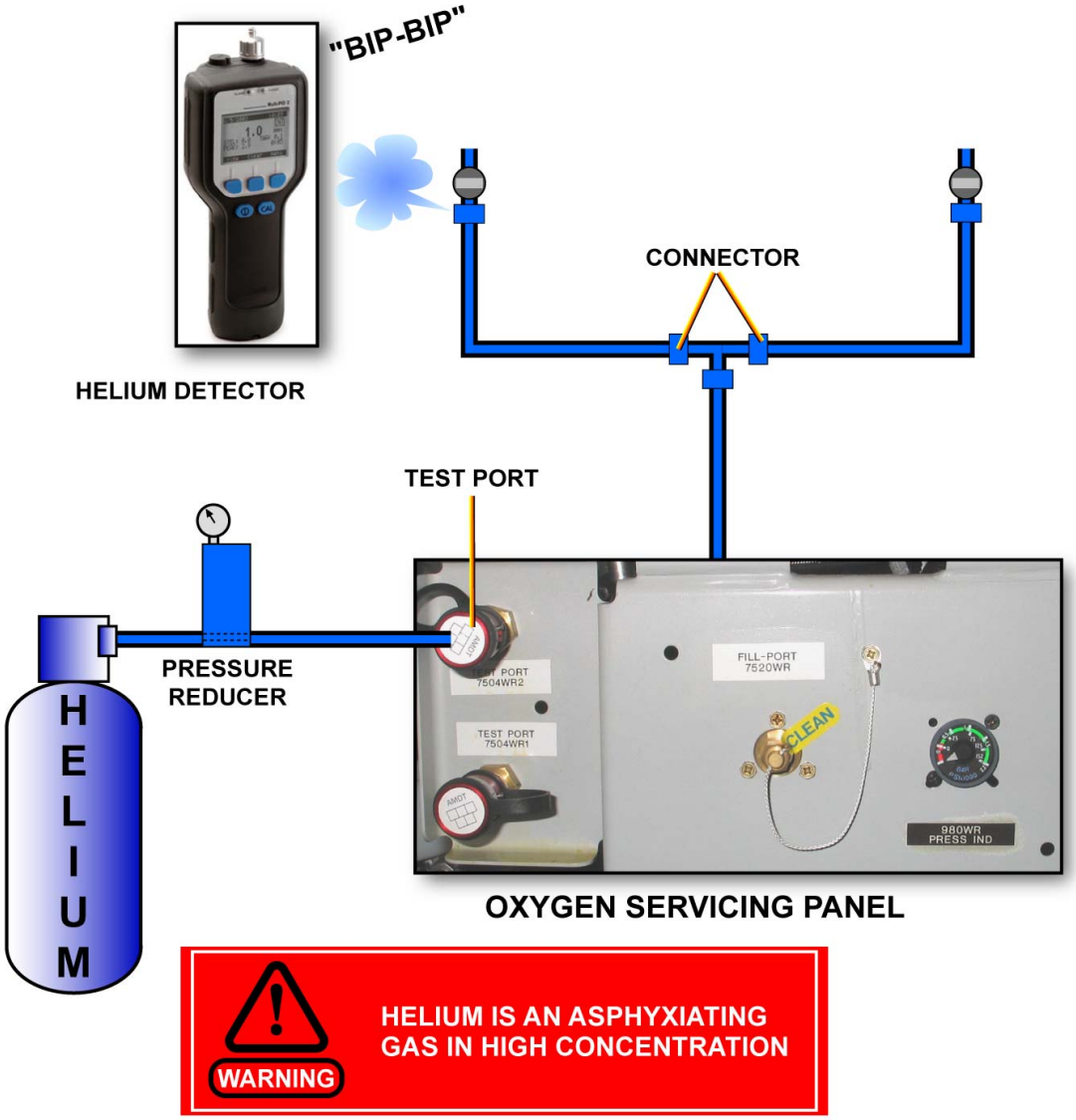

LEAK DETECTION PRODUCT

SAFETY PRECAUTIONS - LEAK DETECTION

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OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Safety Precautions (continued)

Oxygen Specific Use

Oxygen must be used only for oxygen system servicing.
Never use oxygen for other purposes such as tire or accumulator inflation, blowing of dust...

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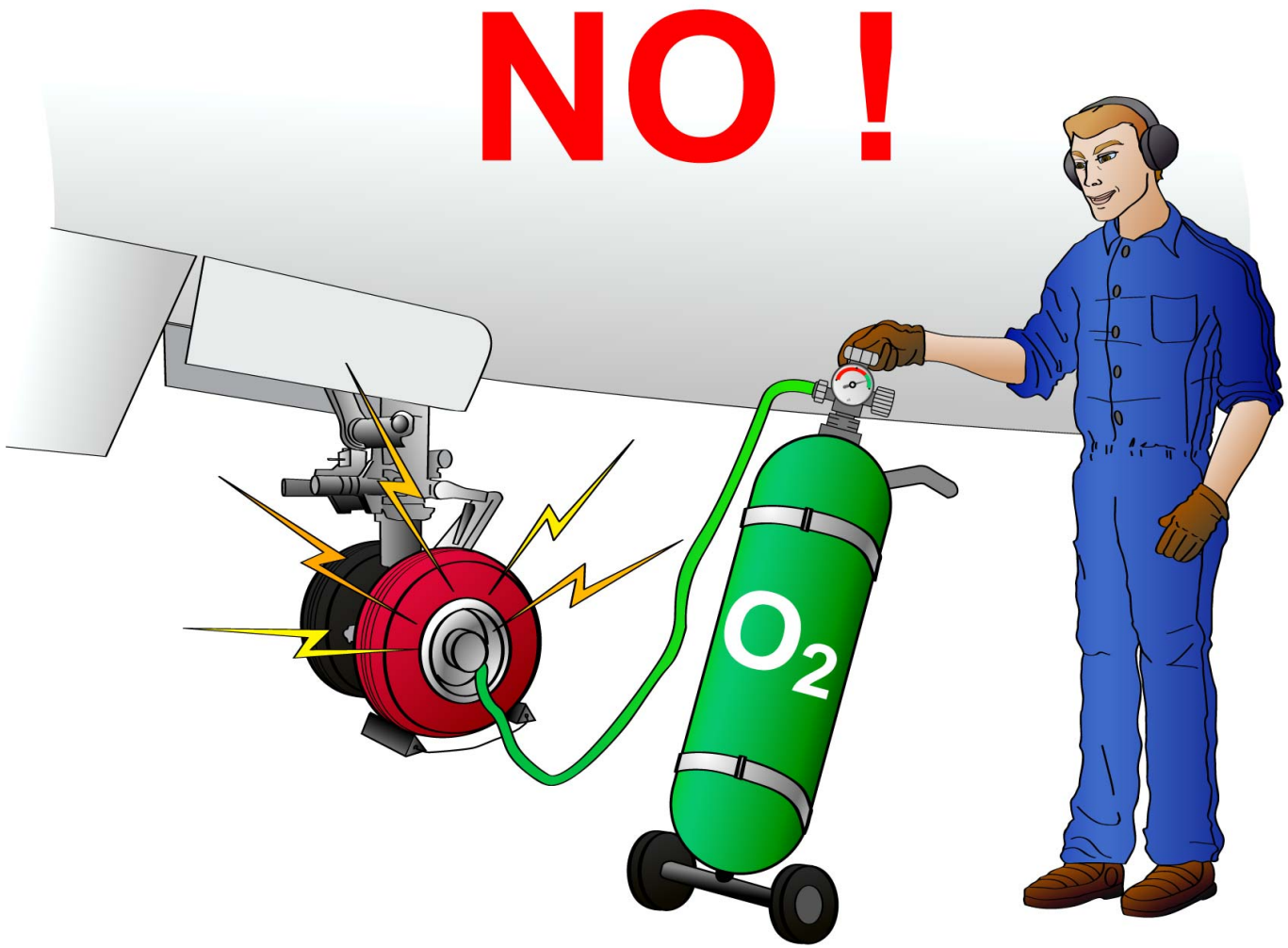

OYXGEN USED ONLY FOR OXYGEN SYSTEM SERVICING

SAFETY PRECAUTIONS - OXYGEN SPECIFIC USE

OXYGEN SAFETY IN AIRCRAFT MAINTENANCE ENVIRONMENT (2)

Safety Precautions (continued)

Oxygen Transportation

Oxygen cylinders or oxygen chemical generators are classified as dangerous material.
As a result, their transportation by aircraft is restricted and must comply with specific regulations of International Air Transport Association (IATA).

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SAFETY PRECAUTIONS - OXYGEN TRANSPORTATION

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FLIGHT CREW OXYGEN SYSTEM D/O (3)

STOWAGE BOX LOCATION

The stowage box assemblies are installed in the cockpit next to each flight crew station. Each stowage box assembly contains one full-face quick donning mask.

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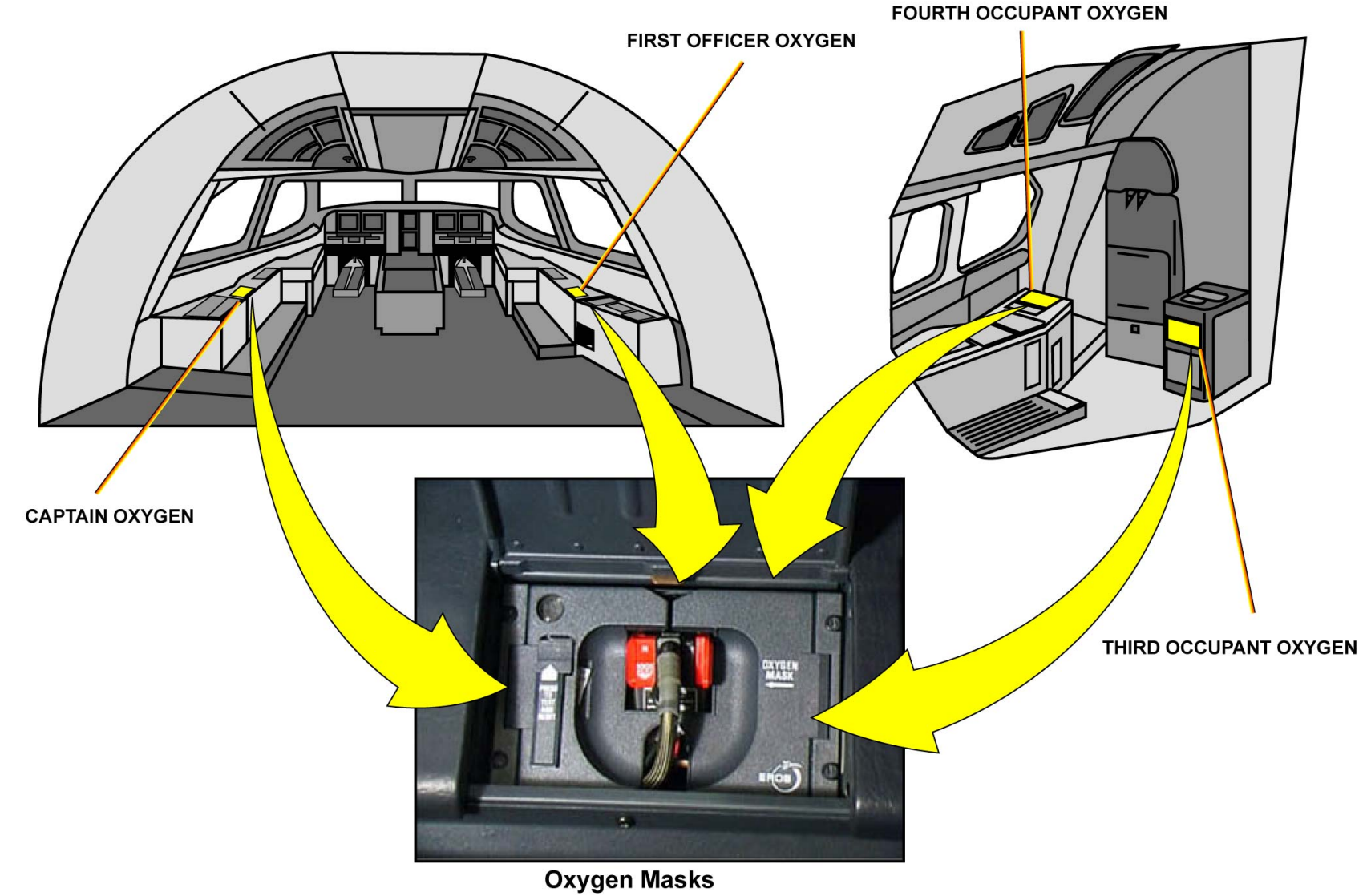

STOWAGE BOX LOCATION

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FLIGHT CREW OXYGEN SYSTEM D/O (3)

STOWAGE BOX DESCRIPTION

Each stowage box is the connection point for the full-face quick donning mask which is kept in the box until required for use.
Each stowage box includes:
- a pneumatic supply valve,
- a two-flap door with a test and reset button incorporated in one of both flaps,
- a quick-disconnect coupling to supply the mask,
- a microphone connector.

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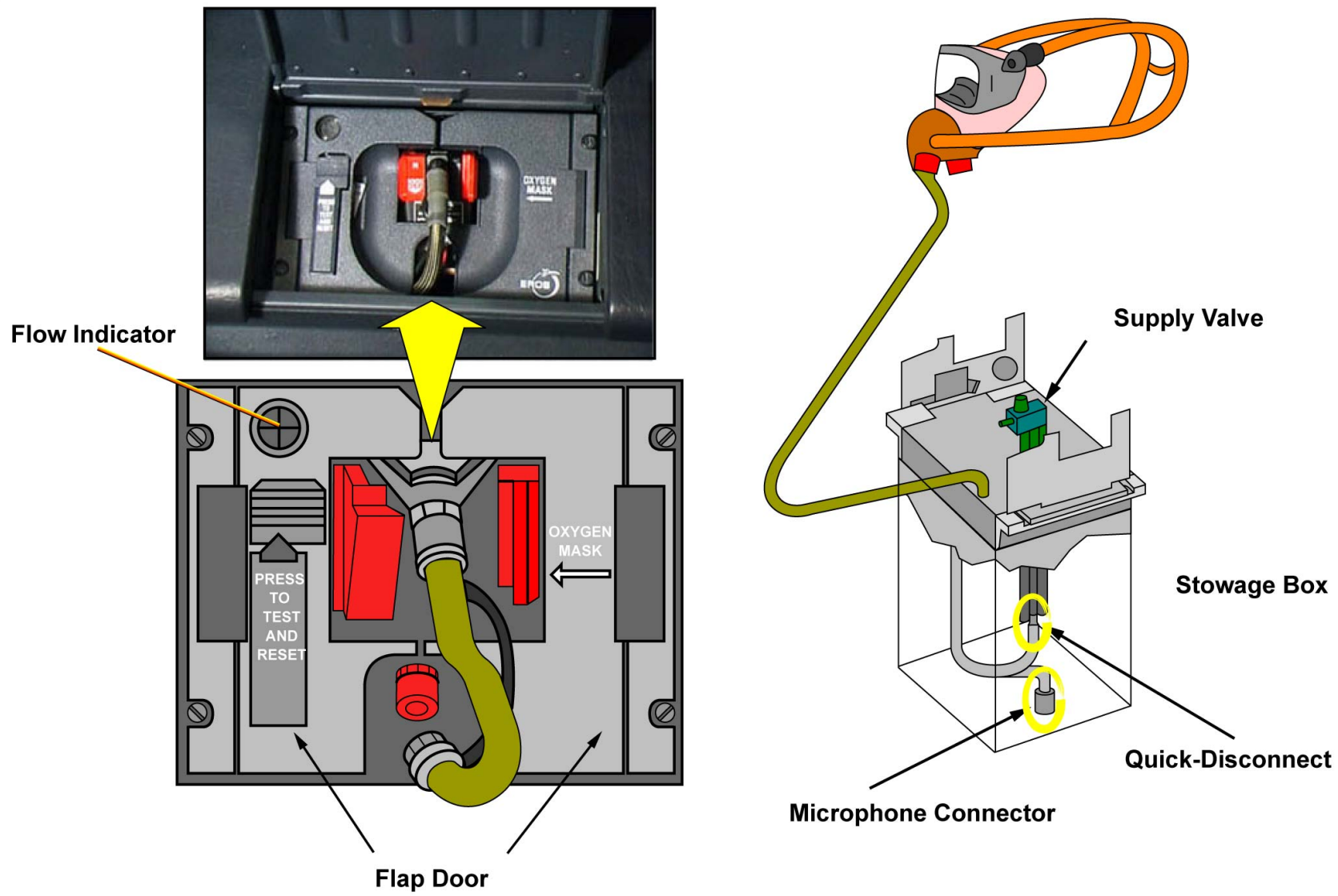

STOWAGE BOX DESCRIPTION

FLIGHT CREW OXYGEN SYSTEM D/O (3)

STOWAGE BOX/ SUPPLY VALVE OPERATION

When the left flap door is closed, the piston valve shuts off the mask oxygen supply.
When the mask is pulled out for use, the opening of the left flap door releases the piston valve which opens under supply pressure.
When the mask is in use, the flow indicator blinker operates under the differential pressure created by the restrictor. Then, the first closing of the left flap door triggers the OXYGEN ON flag. After re-stowing the mask and closing the two-flap door, the test and reset button must be pushed, then the OXYGEN ON flag disappears.
For test purposes, the test and reset button pressed on, releases the piston valve and allows the mask in situ test to be performed.

MASK STOWED

When the mask is stowed with the storage box doors closed, the slider/flag installed on the left door maintains the piston valve closed under the spring force. Oxygen supply of the mask is shut-off. The mask microphone is not active (proximity switch open).

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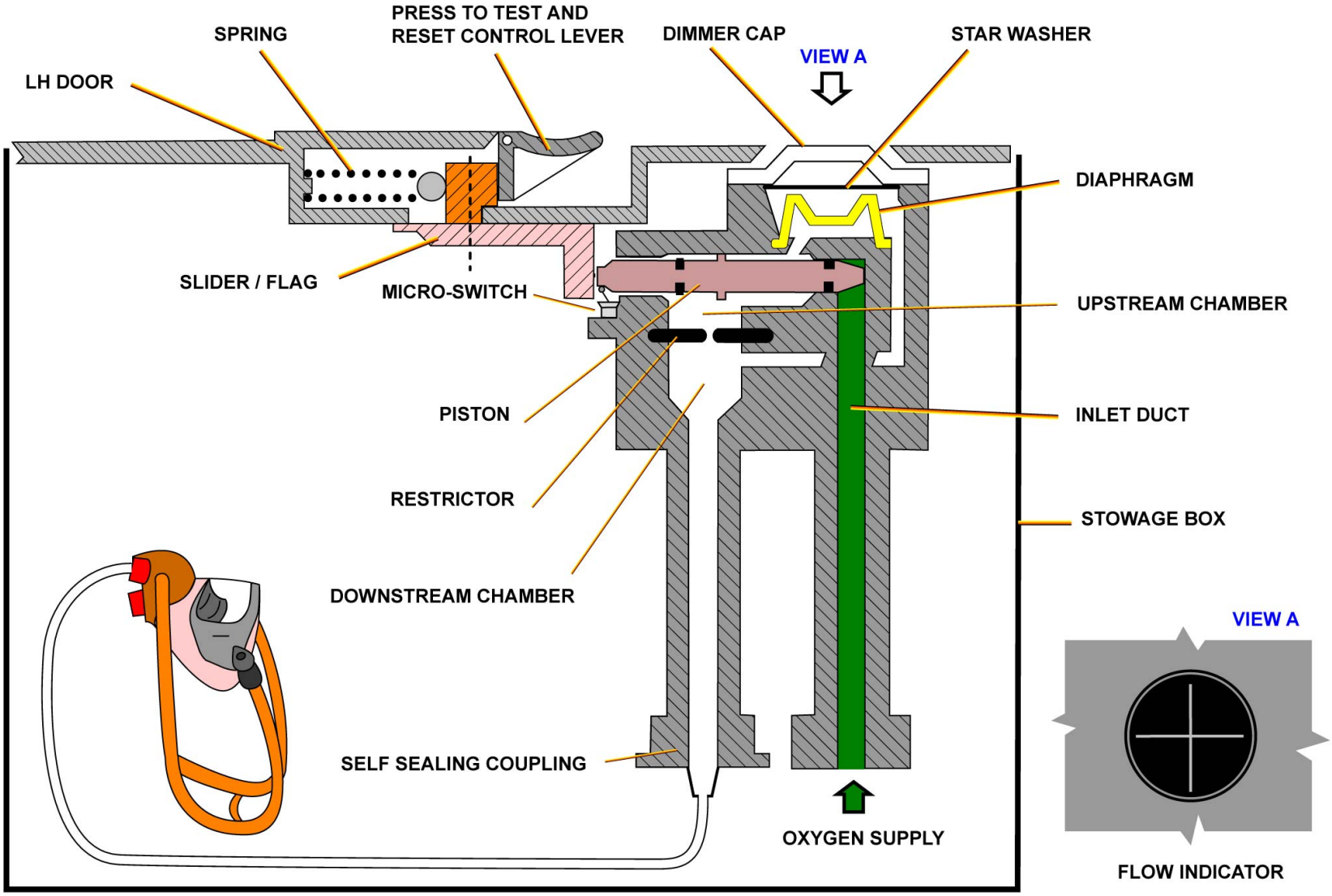

STOWAGE BOX/ SUPPLY VALVE OPERATION - MASK STOWED

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FLIGHT CREW OXYGEN SYSTEM D/O (3)

STOWAGE BOX/ SUPPLY VALVE OPERATION (continued)

MASK IN USE

When the mask is pulled out from the stowage box for use the opening of the left flap door releases the piston valve which opens under the oxygen supply pressure. Oxygen is then supplied to the mask and the microphone is getting activated by the closure of the proximity switch. When the mask is in use (with oxygen flowing through the mask), the flow indicator operates (it turns yellow) under the differential pressure created by the restrictor.

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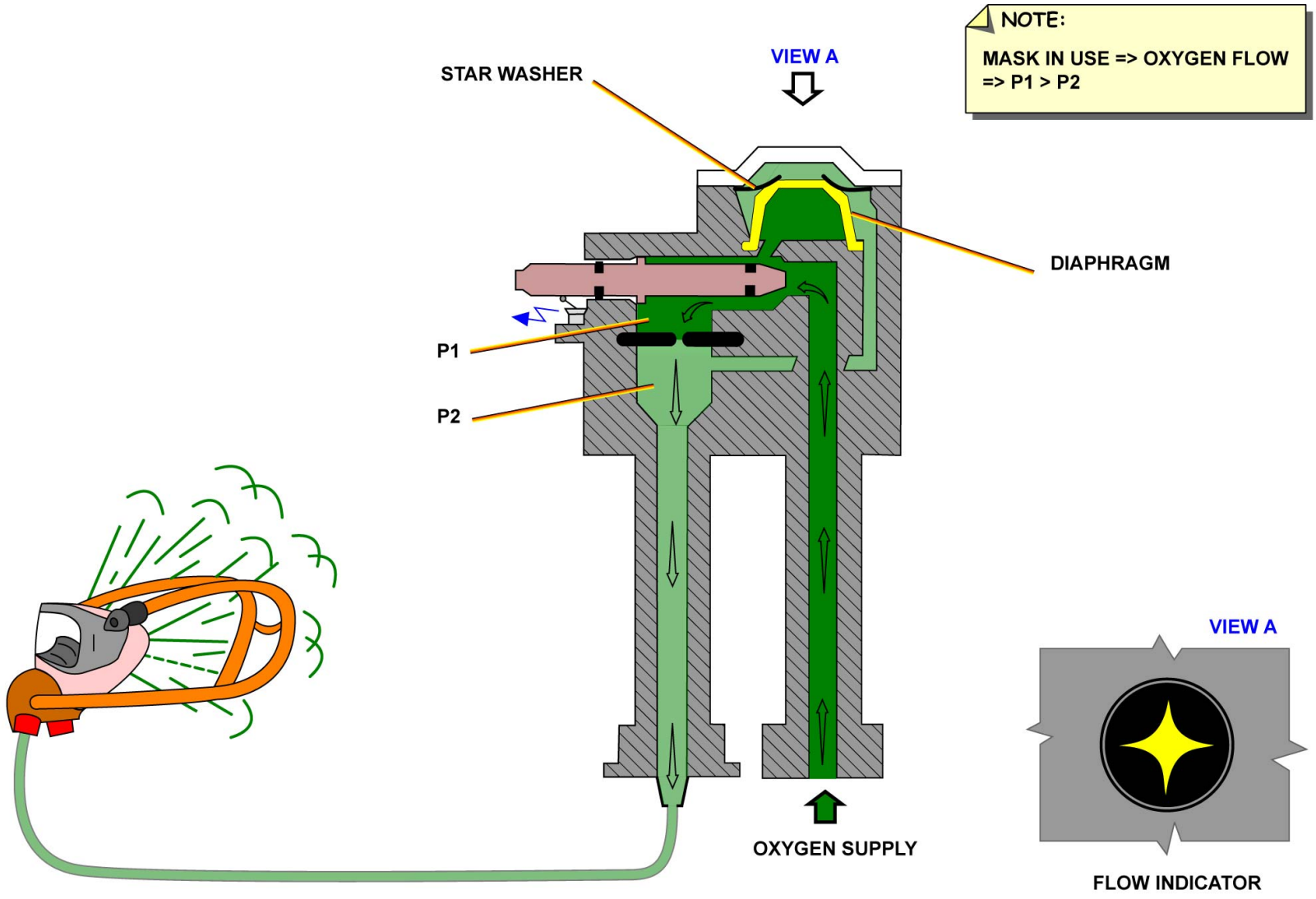

STOWAGE BOX/ SUPPLY VALVE OPERATION - MASK IN USE

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FLIGHT CREW OXYGEN SYSTEM D/O (3)

STOWAGE BOX/ SUPPLY VALVE OPERATION (continued)

MASK STOWED AFTER USE

After usage the mask is stowed and the stowage box doors are closed. Closing the left doors triggers the "OXY ON" flag. The piston valve remains open; the flexible hose remains pressurized; the microphone remains active.

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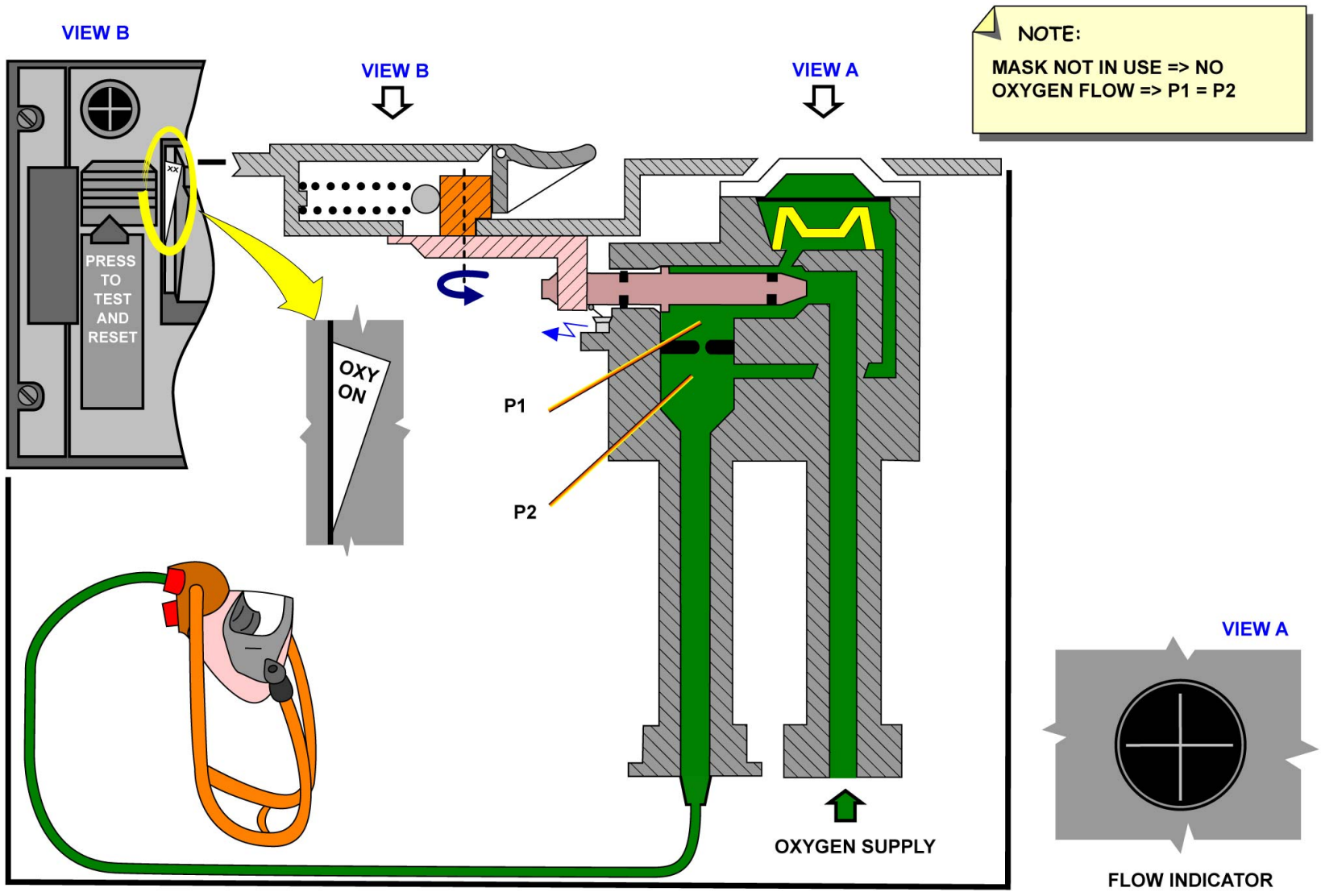


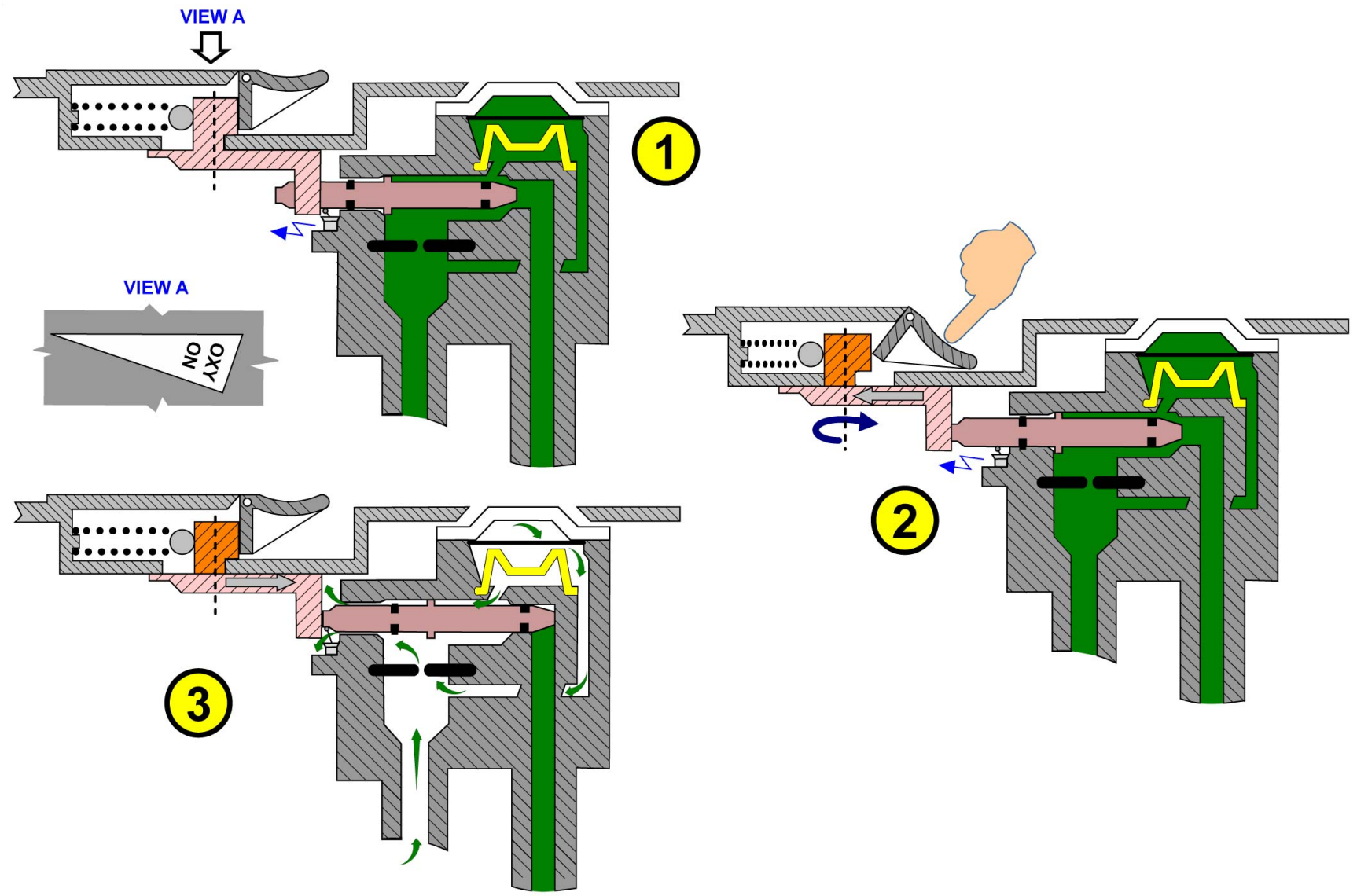
STOWAGE BOX/ SUPPLY VALVE OPERATION - MASK STOWED AFTER USE

G9409341 - GAUT0T0 - FM35D1F35A40102

FLIGHT CREW OXYGEN SYSTEM D/O (3)

STOWAGE BOX/ SUPPLY VALVE - RESET

By pressing then releasing the "PRESS TO TEST AND RESET" button on the left flap door after mask stowage the "OXY ON" flag goes out of view; the piston valve closes pushed by the slider/flap under spring force; mask oxygen supply is shut-off; the entrapped oxygen pressure in the flexible hose is vented, the microphone is getting de-activated by the proximity switch opening.



STOWAGE BOX/ SUPPLY VALVE - RESET

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FLIGHT CREW OXYGEN SYSTEM D/O (3)

MASK IN SITU OPERATIONAL TEST - LEAK TEST

Sealing of the flexible hose and regulator can be checked in situ by pressing the "PRESS TO TEST AND RESET" button on the left flap door: If there is no leak, pressing this button and holding it pressed the flow indicator turns yellow for a short time then goes black. In case of leakage the flow indicator remains yellow all the time the button is pressed.
Ref: AMM, Operational test of the Full-Face/Quick-donning Mask.

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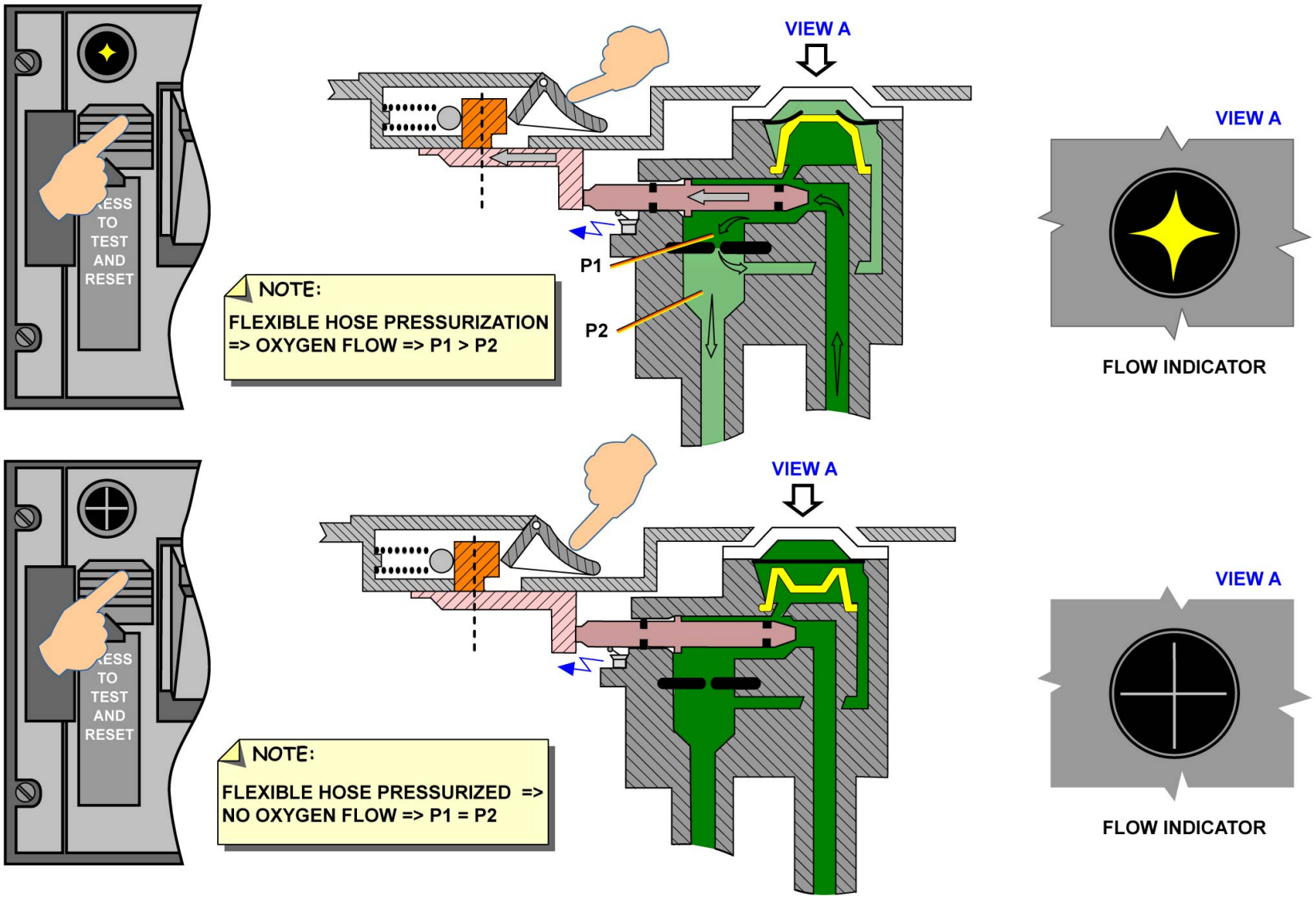

MASK IN SITU OPERATIONAL TEST - LEAK TEST

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FLIGHT CREW OXYGEN SYSTEM D/O (3)

MASK IN SITU OPERATIONAL TEST - OXYGEN SUPPLY / MICROPHONE OPERATION

Oxygen flow through the mask regulator and microphone operation can be checked in situ by pressing simultaneously the "PRESS TO TEST AND RESET" button on the left flap door and the "PRESS TO TEST / EMERGENCY" knob on the mask regulator.

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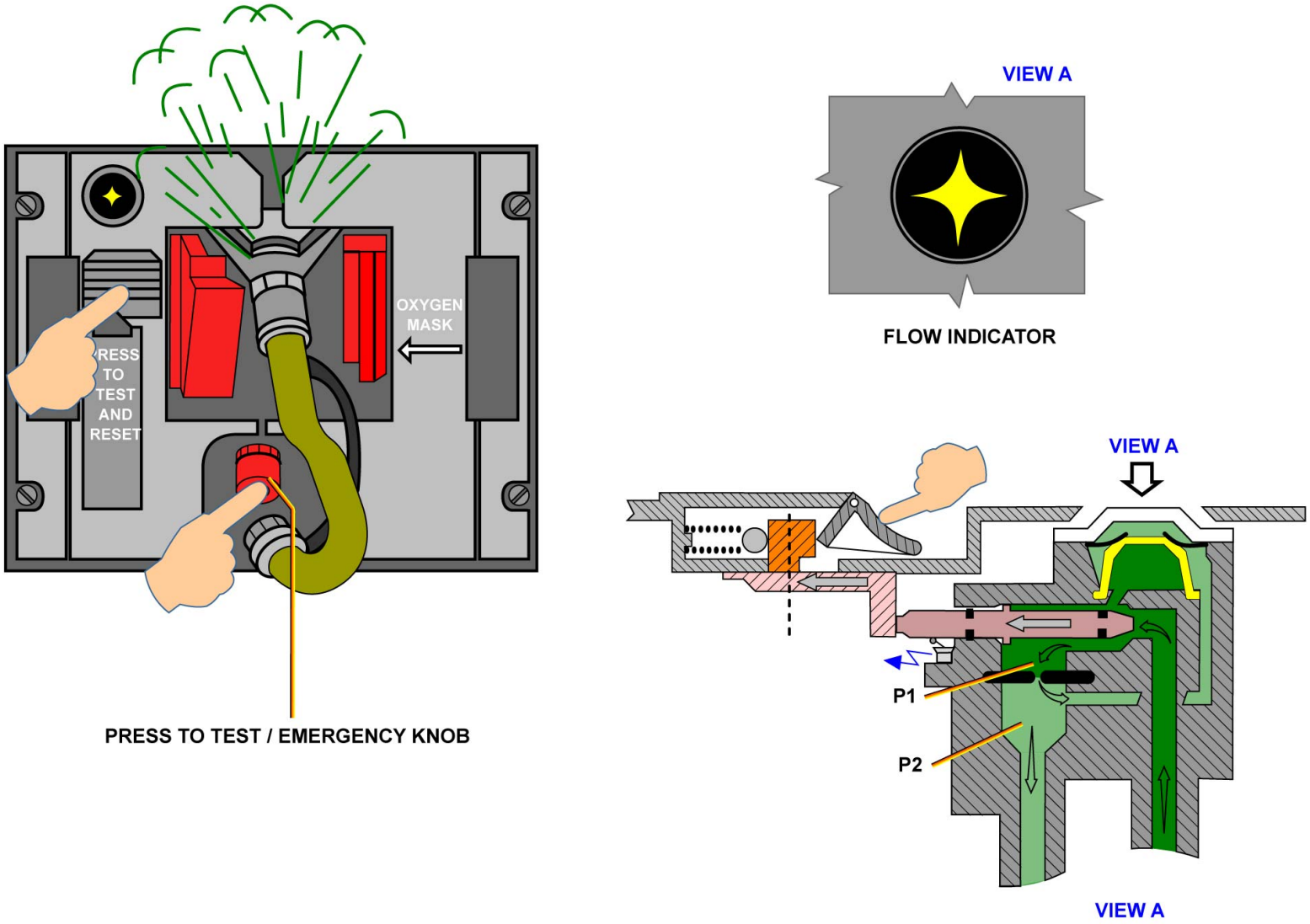


MASK IN SITU OPERATIONAL TEST - OXYGEN SUPPLY / MICROPHONE OPERATION

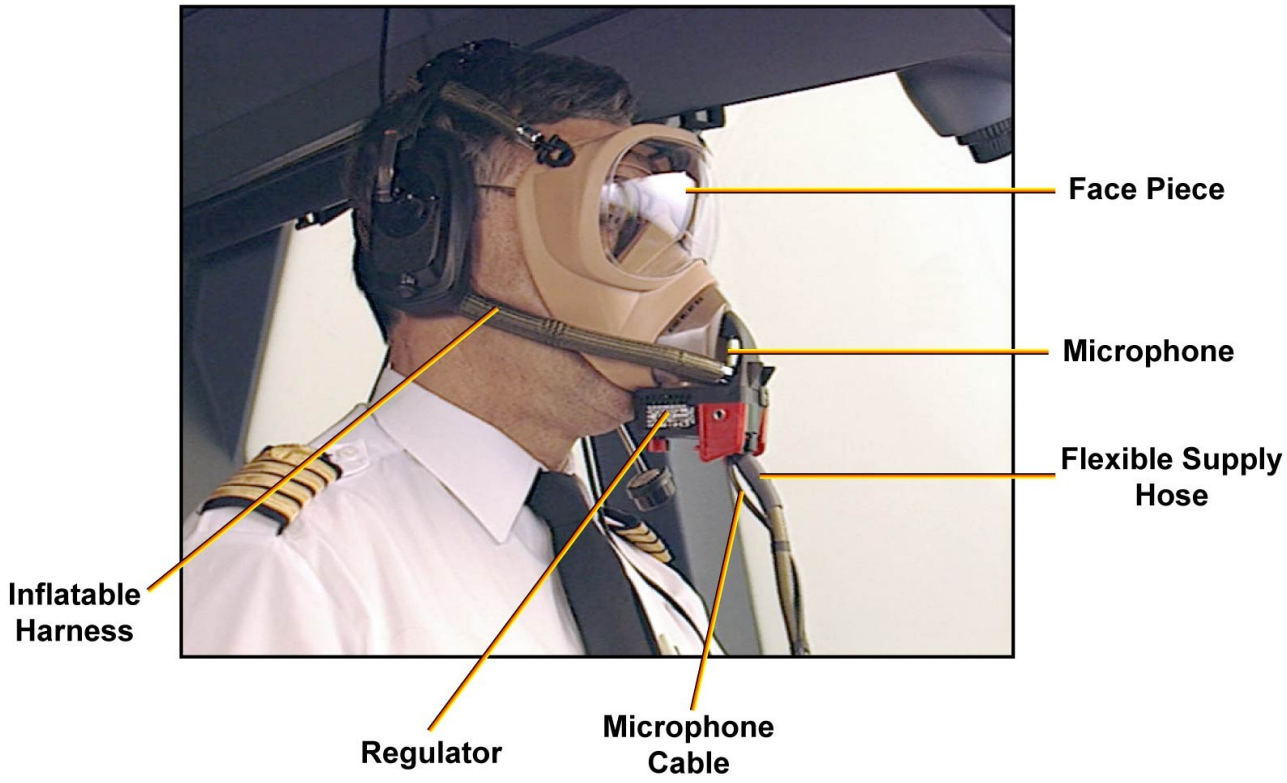
FLIGHT CREW OXYGEN SYSTEM D/O (3)

CREW MASKS

The mask is connected to the stowage box via a flexible supply hose and a microphone cable fitted with a quick disconnect.
The mask face piece is equipped with a microphone and an inflatable harness which maintains the mask tight against the user's face.

MICROPHONE

The microphone allows radio communications when the mask is used.
The pressure switch, fitted on the stowage box supply valve, enables the operation of the microphone only when the mask is supplied by oxygen pressure.



CREW MASKS & MICROPHONE

FLIGHT CREW OXYGEN SYSTEM D/O (3)

REGULATOR

The regulator is fitted on the mask and controls the air/oxygen flow. The regulator performs the following functions.
It performs air and oxygen dilution. When the normal/100% selector is in the normal position, the user breathes a mixture made of cabin air and oxygen on demand. The regulator comprises one aneroid capsule that provides cabin air and oxygen mixed together and regulated up to 35,000 ft. Above this altitude it is oxygen only.
It performs 100% oxygen supply without overpressure. When the normal/100% selector is set to 100%, the user breathes pure oxygen at all altitudes.
It performs automatic overpressure. The regulator comprises a second aneroid capsule that provides automatic overpressure above 30,000 ft cabin altitude.
It performs a regulator functional test. The regulator can be tested by pressing the TEST/EMERGENCY knob.
It also performs an emergency function. When the TEST/EMERGENCY knob is turned to the EMERGENCY position, continuous oxygen overpressure is supplied to the mask.
It also controls harness inflation. The inflatable harness is inflated when the inflation control plates are squeezed.

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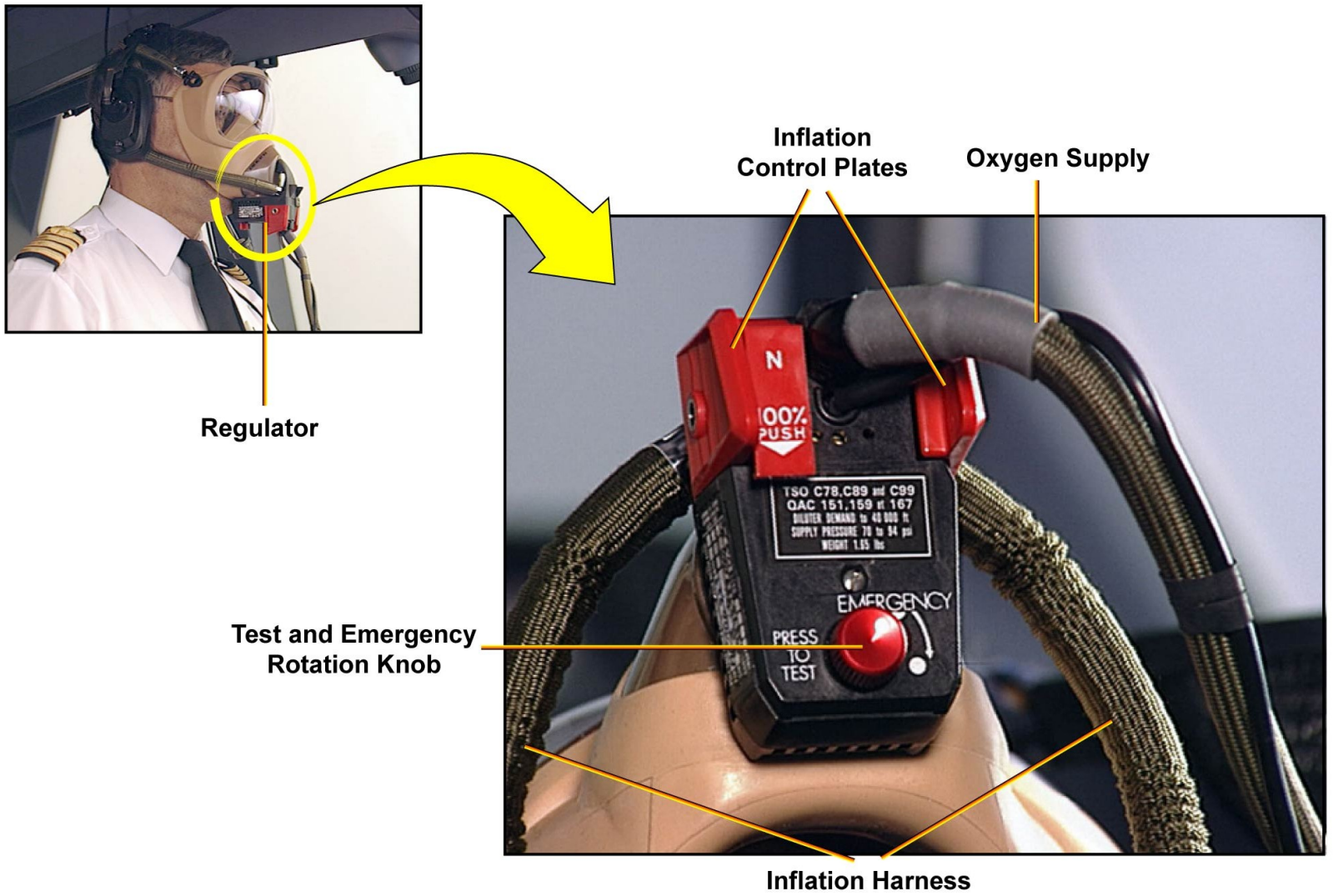

REGULATOR

G9409341 - GAUT0T0 - FM35D1F35A40102

FLIGHT CREW OXYGEN SYSTEM D/O (3)

CREW INTEGRAL OXYGEN MASK IN SITU TEST VIDEO

The video presents the cockpit oxygen masks.

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CREW INTEGRAL OXYGEN MASK IN SITU TEST VIDEO

PASSENGER CHEMICAL OXYGEN SYSTEM D/O (3)

TRIGGERING

The chemical oxygen generator supplies a flow of LP oxygen for a minimum time of 22 minutes for the A340-500/600 and 15 minutes for the A330-200/300, A340-300. In case of rapid cabin depressurization, oxygen masks are automatically presented to passengers.

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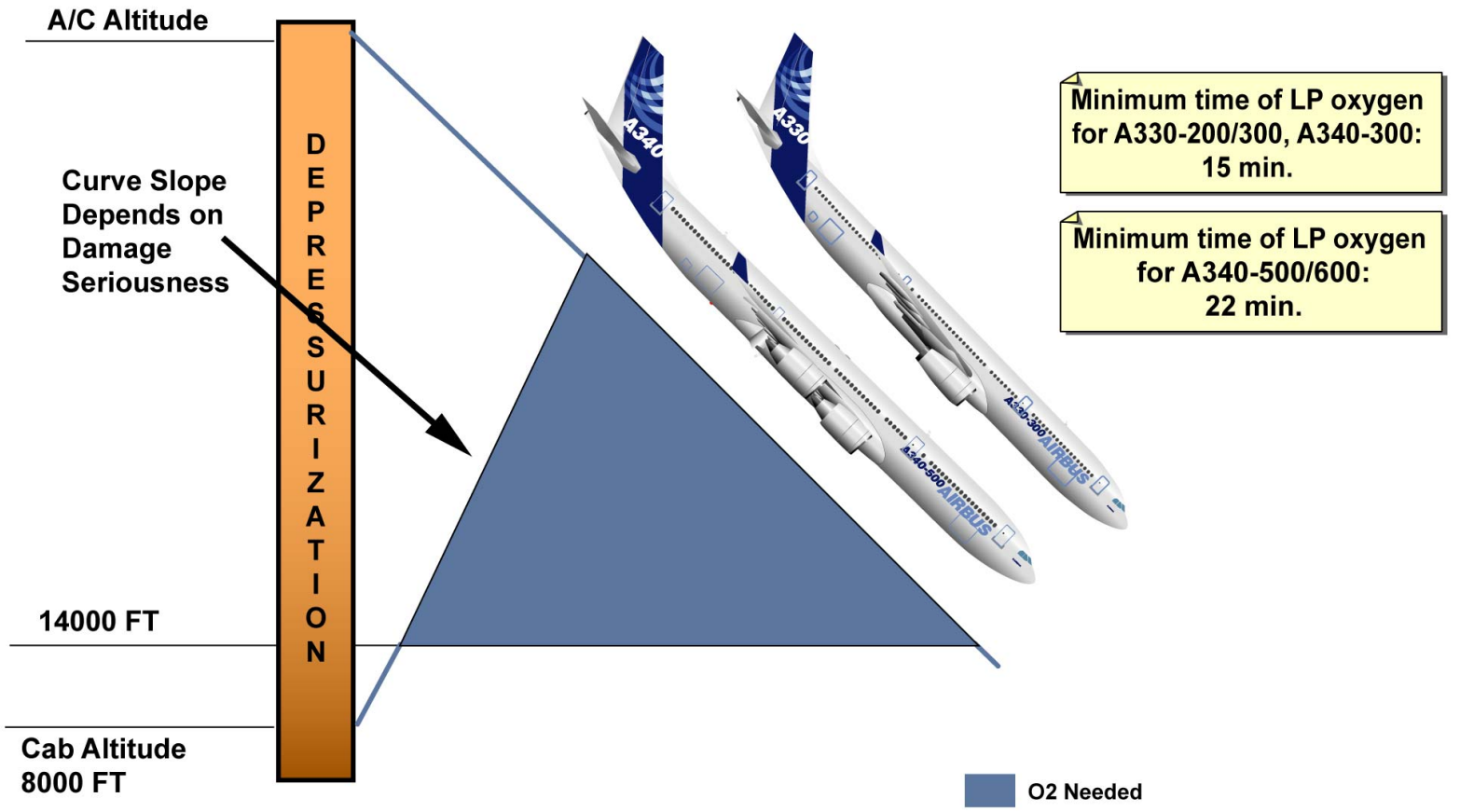
A/C Altitude
Curve Slope Depends on Damage Seriousness
DEPRESSURIZATION
14000 FT
Cab Altitude 8000 FT
Minimum time of LP oxygen for A330-200/300, A340-300: 15 min.
Minimum time of LP oxygen for A340-500/600: 22 min.
O2 Needed

TRIGGERING

PASSENGER CHEMICAL OXYGEN SYSTEM D/O (3)

PASSENGER OXYGEN SYSTEM OPERATION

The possible modes of operation of the passenger oxygen system described in this topic are the automatic, manual and reset modes of operation.

AUTOMATIC OPERATION

The system operates automatically when the altitude pressure switch closes. A taped announcement is transmitted over the passenger address system. The taped announcement may be stopped by momentarily pressing the OXYGEN TiMeR RESET P/BSW.
After 6 seconds the time delay relays supply the door latch assemblies via another circuit for safety.
The FAULT light on the OXYGEN TiMeR RESET P/BSW comes on if a failure of both SWITCH OFF relays occurs.

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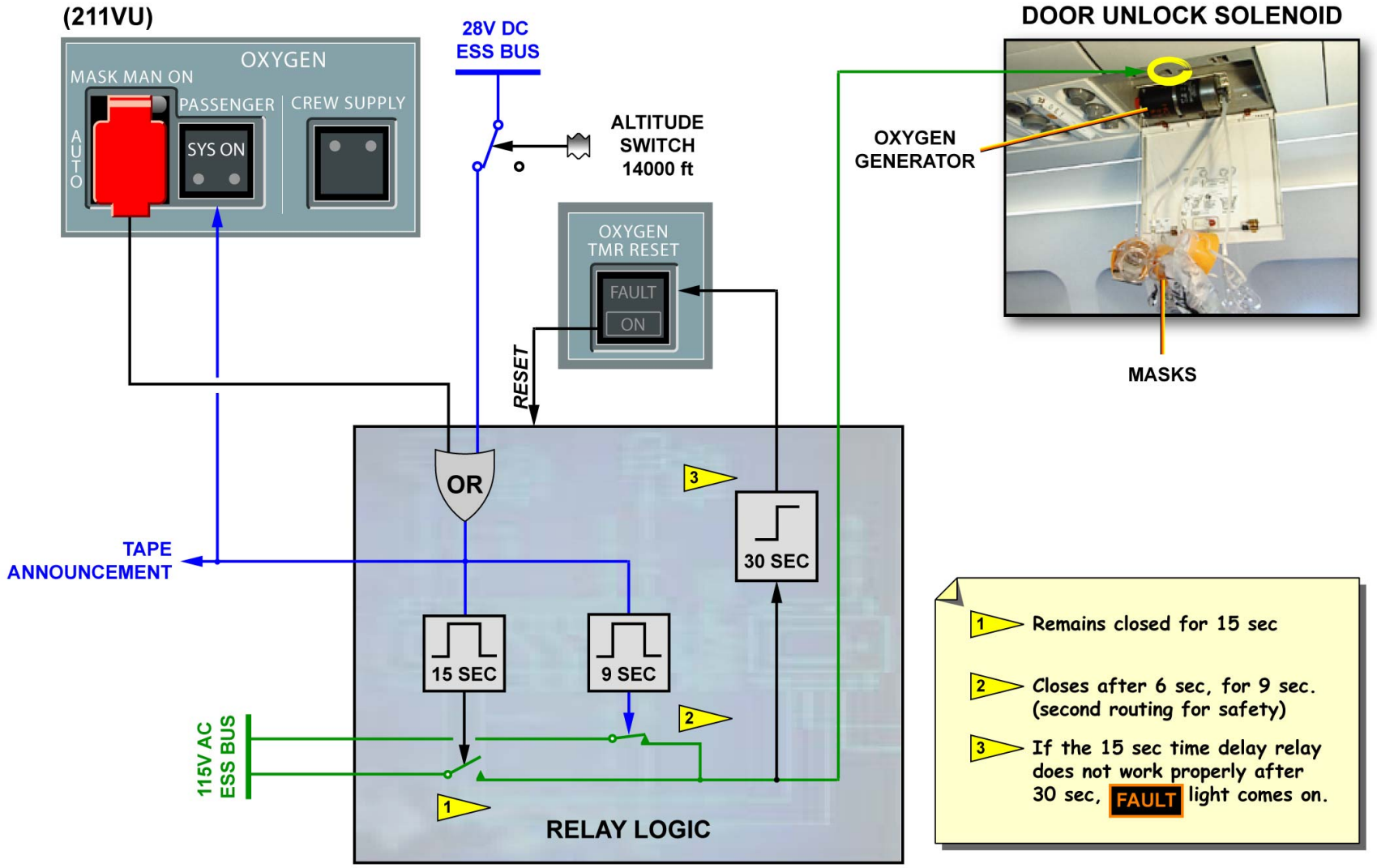

PASSENGER OXYGEN SYSTEM OPERATION - AUTOMATIC OPERATION

G9409341 - GAUT0T0 - FM35D2F35B20102

PASSENGER CHEMICAL OXYGEN SYSTEM D/O (3)

PASSENGER OXYGEN SYSTEM OPERATION (continued)

MANUAL OPERATION

The passenger oxygen masks may be presented at any time via a MASK MAN ON P/B. The manual override relays are energized and supply the door electrical assembly control circuits.
The passenger info and switch off relays are energized via the control relays.
Pressing momentarily the OXYGEN TiMeR RESET P/BSW may stop the taped announcement transmitted over the passenger address system.

RESET OPERATION

Momentarily pressing the TiMeR RESET P/BSW deactivates the passenger info and switch off relays via the fault relays. Momentarily pressing the TiMeR RESET P/BSW on the maintenance panel resets the system.
On ground, used chemical oxygen units must be replaced and all masks restored.

FAULT OPERATION

When the cabin altitude is more than 14.000 ft and system off relays (15s and 6s) remain open after delay:
- the 30 s time delay relay is energized,
- the FAULT amber light comes on,
- the SYS ON white light and Passenger Address systems are still on.

The FAULT light on the TMR RESET P/B comes on if a failure of the TIME DELAY RELAYS occurs.

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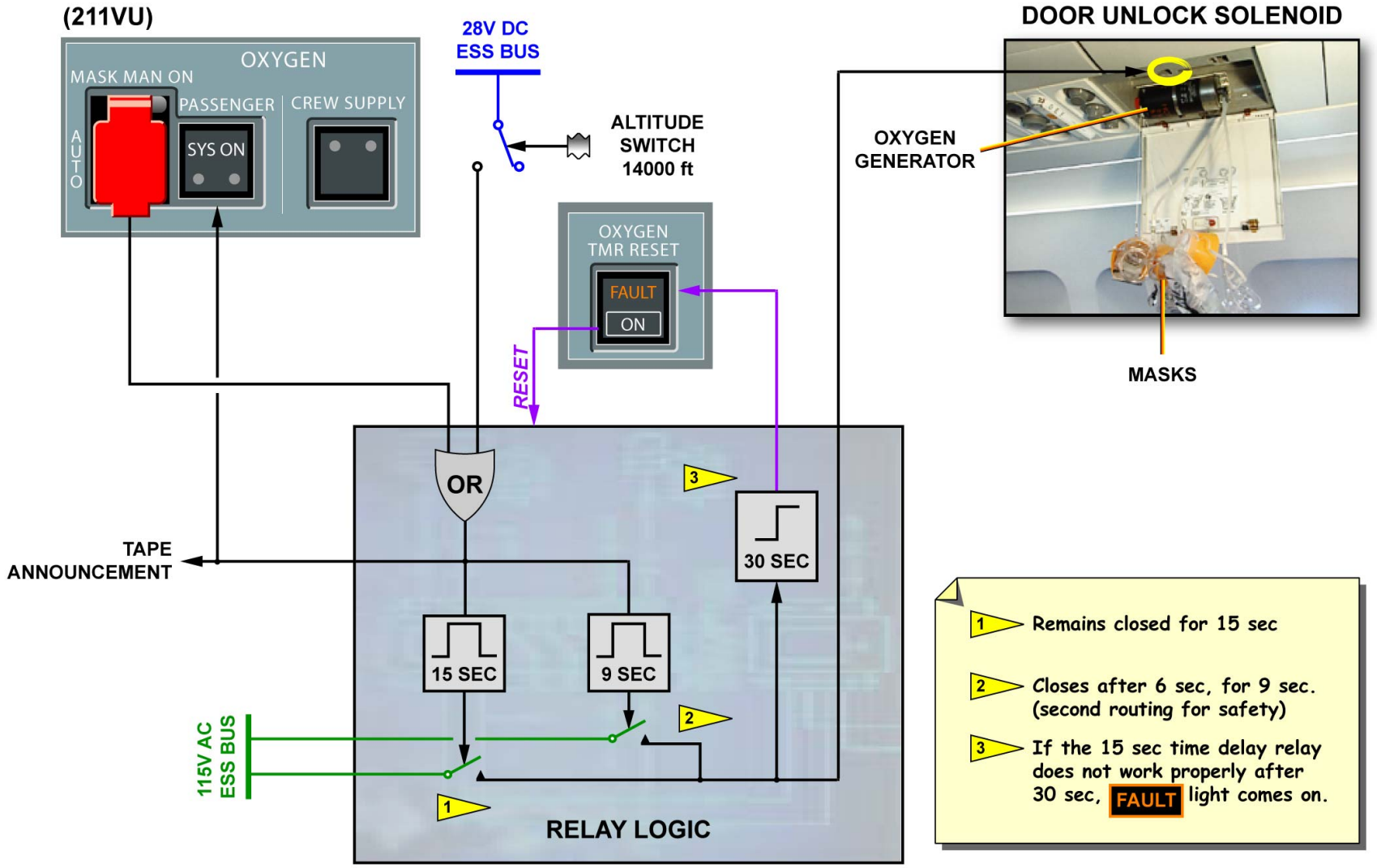

PASSENGER OXYGEN SYSTEM OPERATION - MANUAL OPERATION ... FAULT OPERATION

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PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

GENERAL

The cabin fixed oxygen system supplies (automatically or manually controlled) oxygen to the occupants, in case of cabin depressurization.
The system stores its oxygen in interconnected cylinders (5 up to 18), behind the right hand sidewall lining in the forward cargo compartment.
The oxygen goes to the mask containers in the cabin, via two main supply lines and a network of pipes.
The containers are above the passenger seats, in the lavatories, in each galley, at each cabin crew station and if installed (option) in Flight Crew Rest Compartment (FCRC) and Bulk Crew Rest Compartment (BCRC).
Each container has 2, 3, 4 or 5 masks.
Two oxygen regulators control the flow rate.
The Quantity Calculation and Control Unit (QCCU) supplies the value of the average temperature compensated pressure indicated on the ECAM system page, and a not temperature compensated to the oxygen servicing panel.

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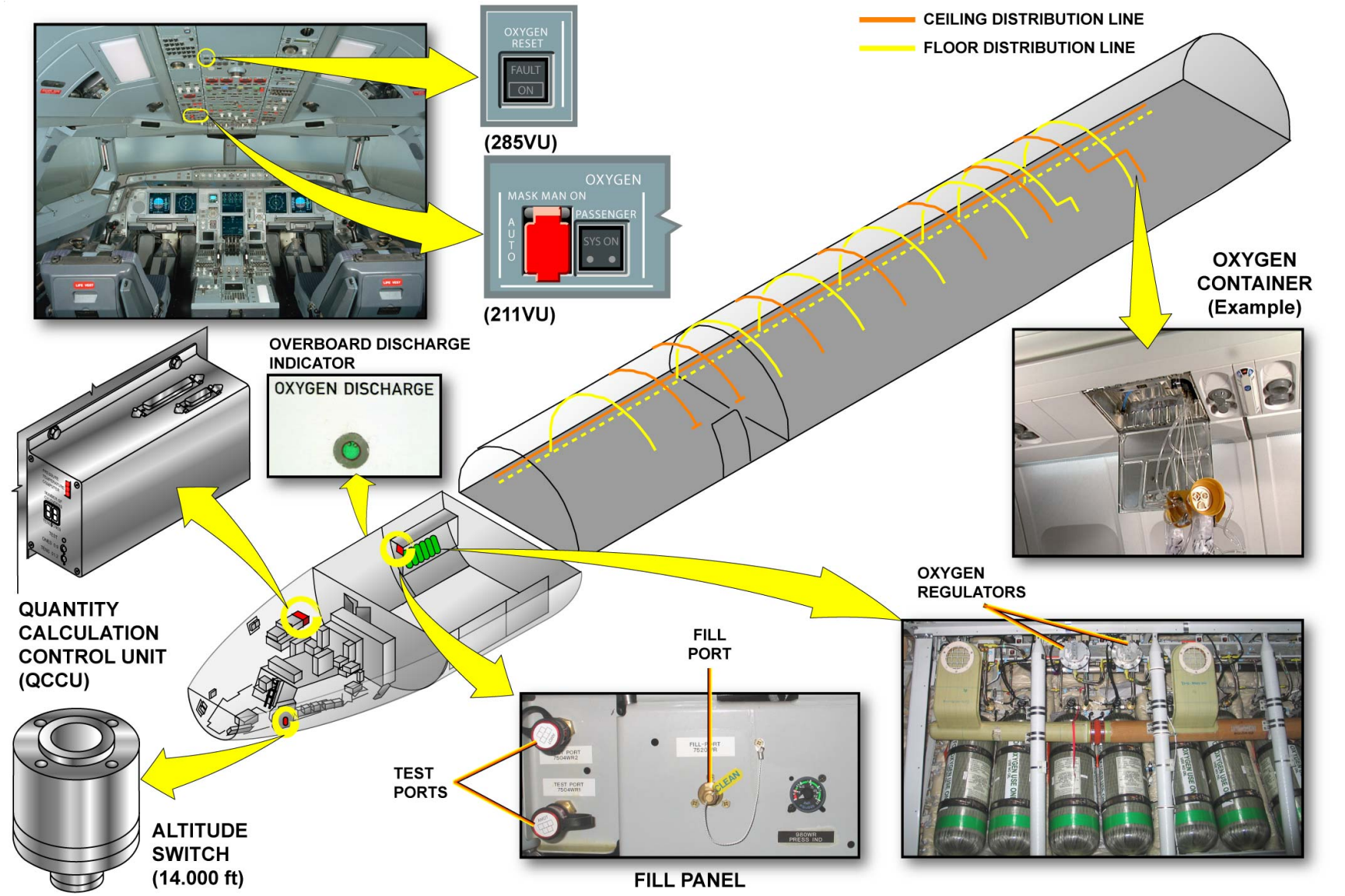
CEILING DISTRIBUTION LINE
FLOOR DISTRIBUTION LINE
OXYGEN RESET
FAULT
ON
(285VU)
OXYGEN
MASK MAN ON
PASSENGER
AUTO
SYS ON
(211VU)
OXYGEN CONTAINER (Example)
OVERBOARD DISCHARGE INDICATOR
OXYGEN DISCHARGE
QUANTITY CALCULATION CONTROL UNIT (QCCU)
OXYGEN REGULATORS
FILL PORT
TEST PORTS
CLEAN
ALTITUDE SWITCH (14.000 ft)
FILL PANEL

GENERAL

PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

MAIN COMPONENTS

OXYGEN STORAGE

The passenger gaseous emergency oxygen is contained in the passenger oxygen storage system.
The emergency oxygen is kept in the oxygen cylinders (nominal pressure 1850 psi (127 bars) at 21°C.
The Pressure Reducer outlet is nominally 130 psi.
The storage system also lets you fill the cylinder assemblies.
OVERPRESSURE PROTECTION:
- Cylinder pressure above 2770 psi (191 bar), a Safety Disk shears and the related cylinder empties overboard.
- Pressure in the low pressure system above 233 psi (16 bar), an independent Pressure Relief Valve relieves the excess of pressure overboard.
In all cases, the green indicator is blown out.

OXYGEN CONTROL AND INDICATING

The passenger oxygen control can be done either:
- automatically when the cabin altitude exceeds 14000 ft (altitude switch)
- or manually from the MASK MAN ON switch.

NOTE: The oxygen container door can be mechanically unlatched by means of a manual release tool.

Information about the condition of the passenger oxygen system is given on:
- the ECAM,
- the OXYGEN panel 211VU and the maintenance panel 285VU.
- the MCDU and QCCU front face.

DISTRIBUTION

When the passenger oxygen distribution system is operated, the pressure reducer supplies low-pressure oxygen via two electro-pneumatic oxygen regulators to the two main supply lines. One line is installed below the cabin floor along the RH side of the aircraft
This makes sure that sufficient oxygen is available for the passengers and the cabin crew if one of the supply lines is damaged in case of engine burst. The passenger oxygen distribution system supplies emergency oxygen to each oxygen container above the passenger seats, in the lavatories, at the cabin attendant stations and optionally the crew rest rooms.
The system is only pressurized in an emergency.
Flexible hoses connect the emergency oxygen containers to the supply system.

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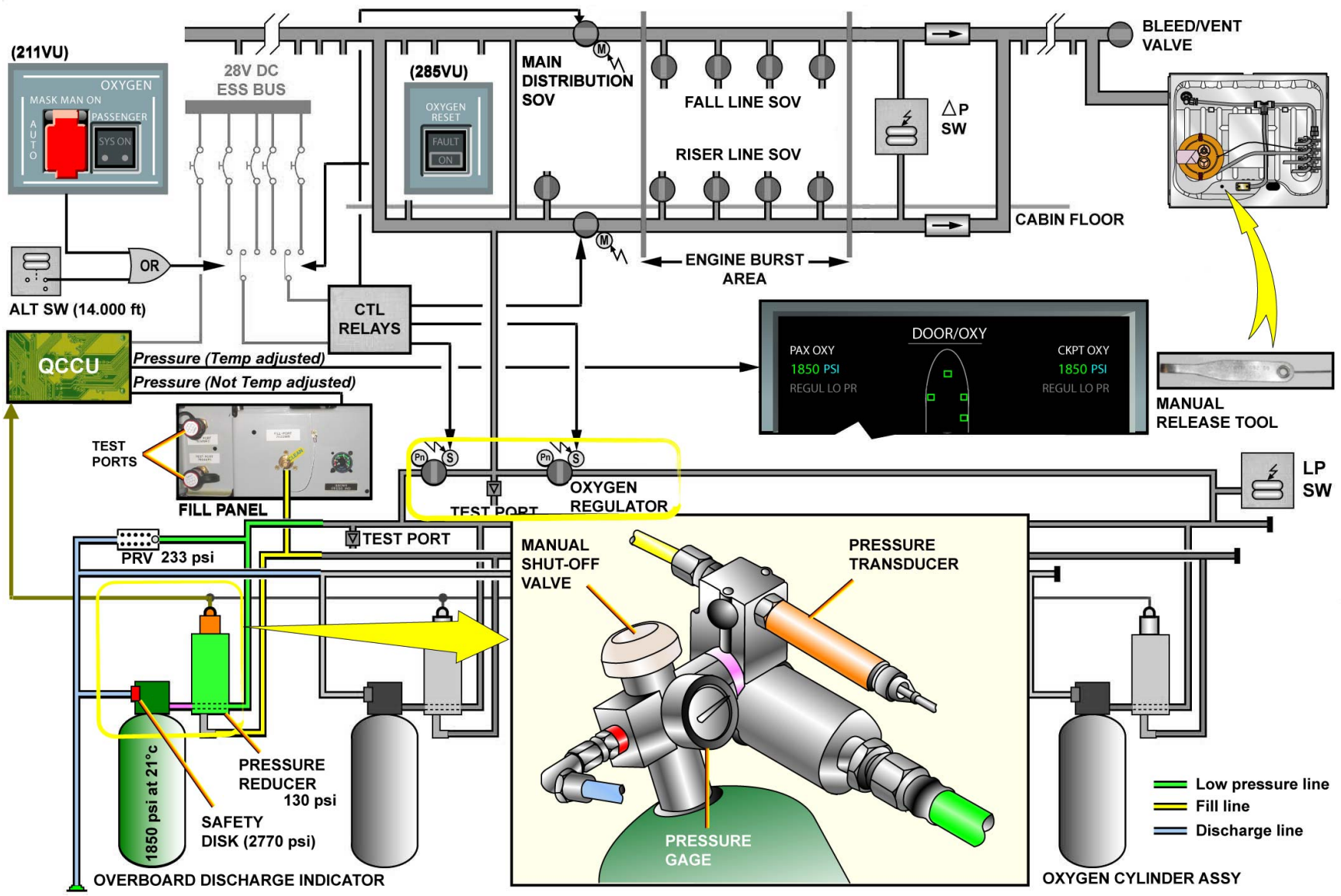

MAIN COMPONENTS - OXYGEN STORAGE ... DISTRIBUTION

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PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

OPERATION

BEFORE OPERATION

The pressure reducer reduces the bottle pressure, from 1850 psi to 130 psi.
The two oxygen regulators are closed.
The two main distribution Shut-Off Valves (SOVs) are open.
The bleed ventilation valve is open, to avoid a risk of pressure build up, or to cause the unlatching of the door.

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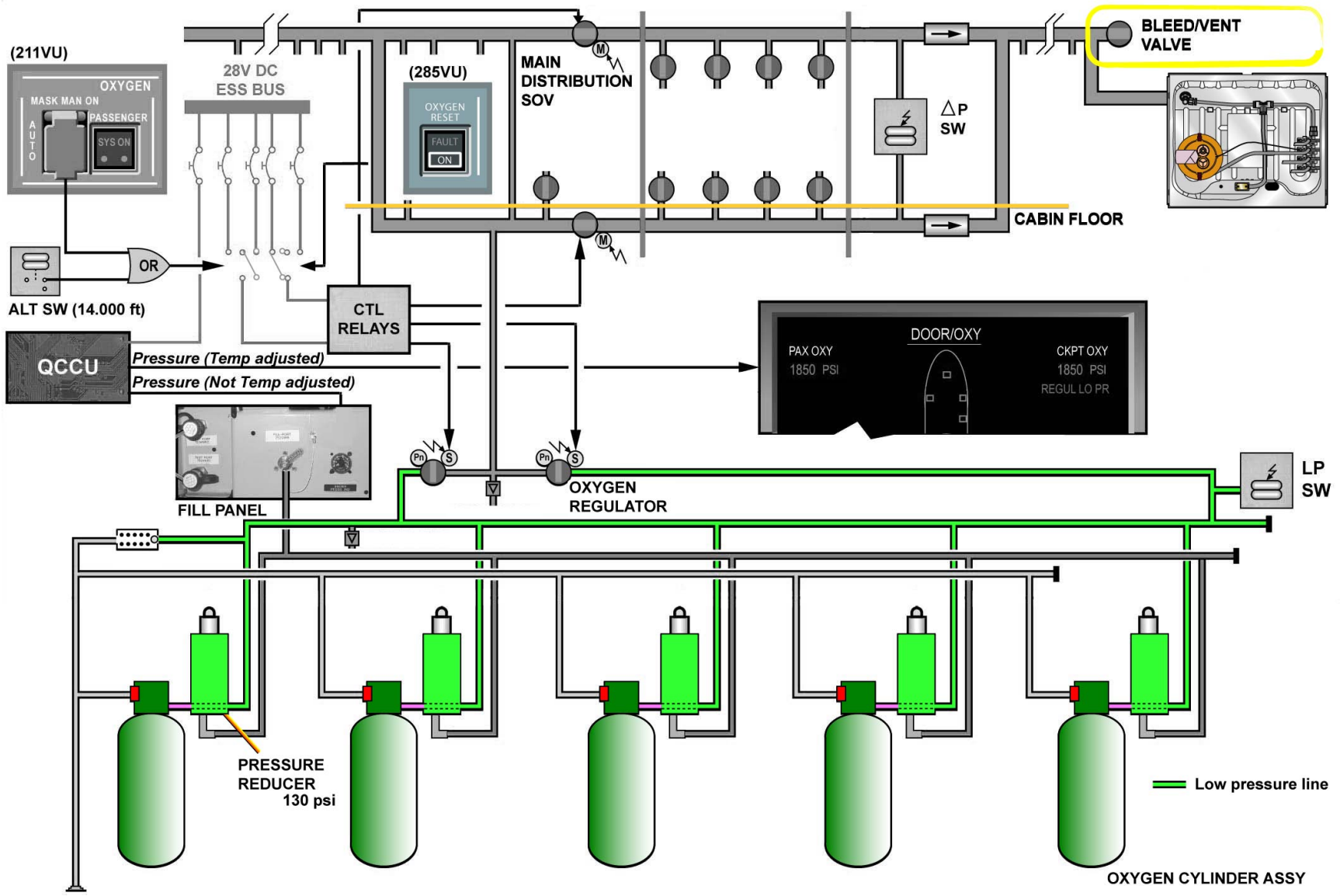

OPERATION - BEFORE OPERATION

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PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

OPERATION (continued)

DURING OPERATION

When the cabin pressure decreases to a pressure equivalent to 14.000 ft (4267 m) (+250/-750ft) the altitude pressure switch will close. This action operates the emergency oxygen system. If the altitude pressure switch does not operate, you can operate the MANual ON P/BSW on the OXYGEN panel, located on the overhead panel.
The oxygen regulators are energized, delivering a flow as a function of the cabin altitude.
The PASSENGER SYS ON light comes on, and the tape announcement is started.
The air caught in the distribution lines is bled through the open bleed/ventilation valve during 5 seconds, and then this valve closes.
The oxygen pressure builds up.
The pneumatically controlled door latches let the oxygen container doors open and the masks fall down.
The passenger pulls the mask to his face, which releases the oxygen flow release pin.
Oxygen is supplied to the mask.
An oxygen flow indication, which is the green part of the mask reservoir bag, inflates.
The Oxygen regulators are designed to supply a continuous flow of oxygen up to 556 masks (depending the version of aircraft).
The oxygen regulator is made of two parts:
- A pressure-regulation unit
- A shut-off valve

The pressure-regulation unit operates pneumatically in two operation modes.
-Surge mode: The surge pressure of 50 psi (3.4 bar) to 124 psi (8.6 bar) releases the oxygen/air mixture through the bleed/vent valve.
After this there is no more air in the oxygen-distribution lines, but only oxygen. This surge of pressure also unlatches the mask container doors and makes oxygen available to the mask when de pressure is 21 psi (1.5 bar) and 43 psi (3.0 bar).
-Distribution mode: A continuous flow of oxygen is supplied to the masks at a suitable pressure based on the cabin altitude, between 6.4 psi (0.44 bar) at 10 000ft and 98.4 psi (6.8 bar) at 40 000ft.
The shut-off valve operates electrically.
It has two electrical inputs, one to open the valve, one to close it (at reset).
Each shut-off valve also has two electrical switches:
- The "valve fully open" switch, which operates the "SYS ON" light.
- The "valve not fully closed" switch, which possibly triggers a warning in case of disagreement between the valve position and the selection.

A test port is given for ground level simulation of high altitudes using a vacuum source. By using this method, the oxygen pressure schedule can be verified without removing the unit from the aircraft.

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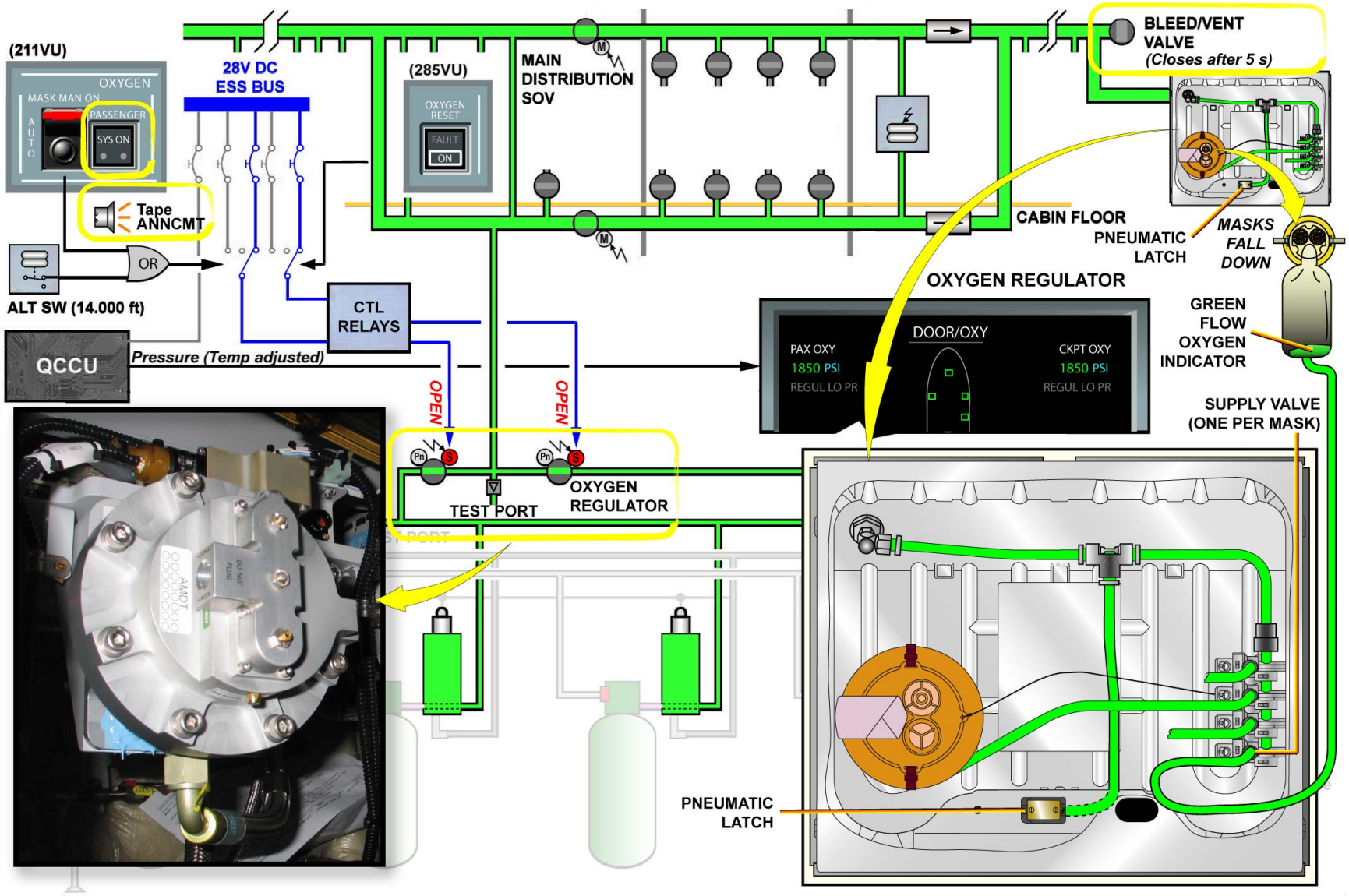

OPERATION - DURING OPERATION

PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

RESET

RESET OPERATION

To set the system back to the initial configuration, the RESET P/BSW on the maintenance panel is pushed:
- the electrical circuit is set to the initial condition,
- the oxygen regulators close,
- the main distribution SOVs open, if they are closed.

The RESET P/BSW operates only if the cabin pressure is below 10.000 ft.

NOTE: Note: the Bleed/Vent Valve opens mechanically.

RESET INDICATING

The RESET ON light goes off when the reset is completed (3 seconds). The PASSENGER SYS ON light goes off.

RESET FAILURE

An unsuccessful RESET happened if the system does not return to the initial condition.
Such failure could be linked to one of these reasons:
- One of the oxygen regulators is not fully closed,
- One of the main distribution SOVs is not fully open,
- Both main distribution SOVs close when the system has been operated.

If a failure occurs during RESET operation the ON light of the RESET P/BSW, on the maintenance panel 285VU will not go off and the FAULT light comes ON. Moreover the warning message REGUL LO PR will be displayed on the ECAM SD Door/Oxy page.

NOTE: The warning "REGUL LO PR" displayed on the ECAM SD Door/Oxy page does not mean always that we have a real low pressure in the circuit as explained above (unsuccessful RESET).

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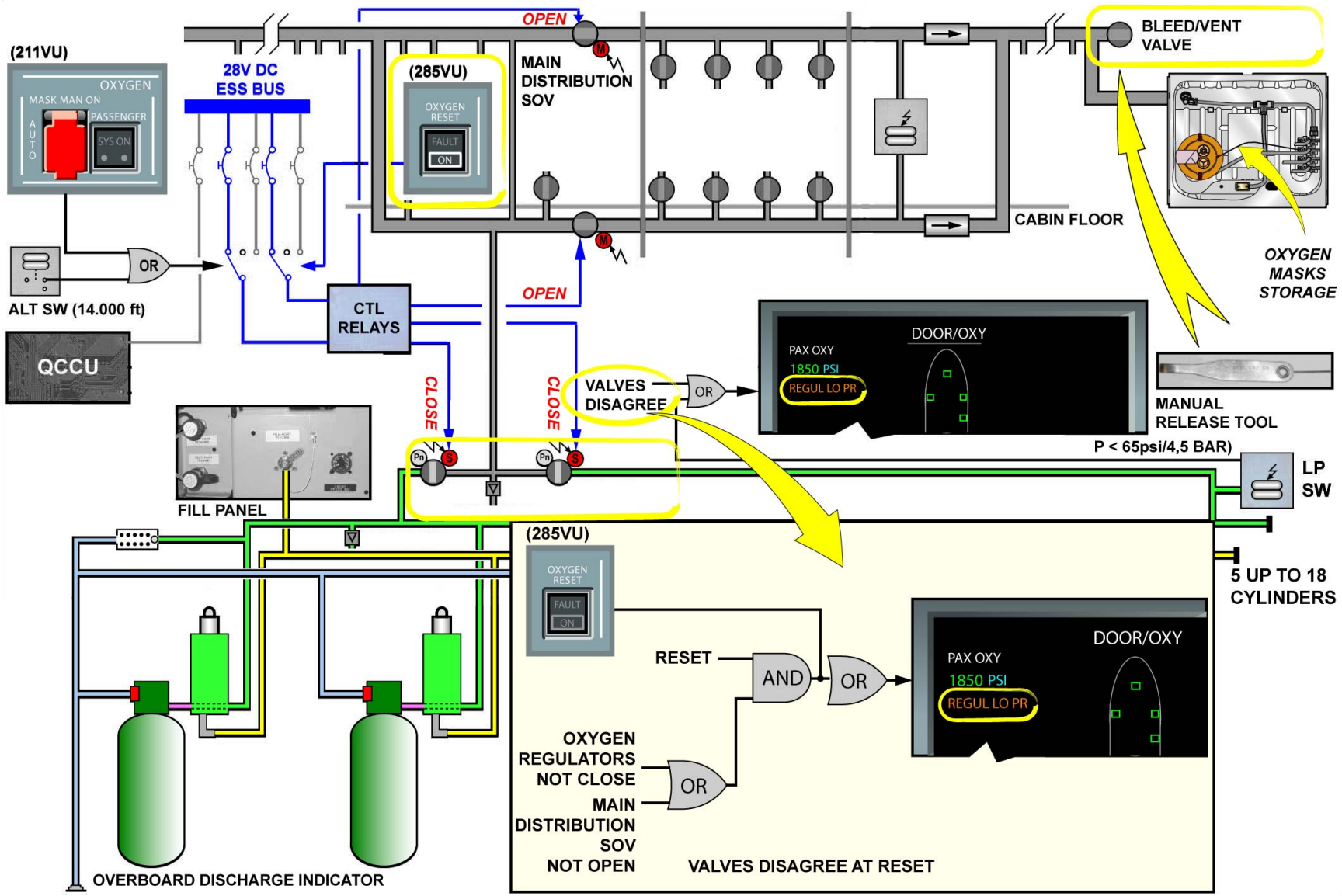

RESET - RESET OPERATION ... RESET FAILURE

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PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

ENGINE BURST

If an engine turbine bursts and damages a main oxygen supply line:
- the differential pressure SW sends a signal to the appropriate main distribution SOV,
- the appropriate main distribution SOV closes,
- the non-return valve will stop the oxygen supply to the related main supply line,

The riser line SOVs will stop the oxygen supply to a damaged riser or fall line.

DIFFERENTIAL PRESSURE SWITCH

The differential pressure SW compares the pressure in the two main distribution lines in the engine burst area. If the pressure difference between the lines is more than 3 psi (0.2 bar), the SW energizes the applicable main distribution SOV, which closes.

RISER LINE SOVs

The riser lines SOVs are installed in the engine burst area:
- on the riser lines at FR 37.2, 40.1, 46, 53.1 and 53.9,
- on the fall lines at FR 38, 41, 49 and 53.4.

They are installed immediately after the connection with the main supply line.
The riser line SOVs are pneumatically controlled so that oxygen is not supplied to a damaged riser line.
In normal operation, the riser line SOVs are open. They close if the flow increases more than 0.42 kg. min (0.9259 lb. min).
A valve will stay closed until the pressure difference across the valve is less than 14.5037 psi (1 bar).

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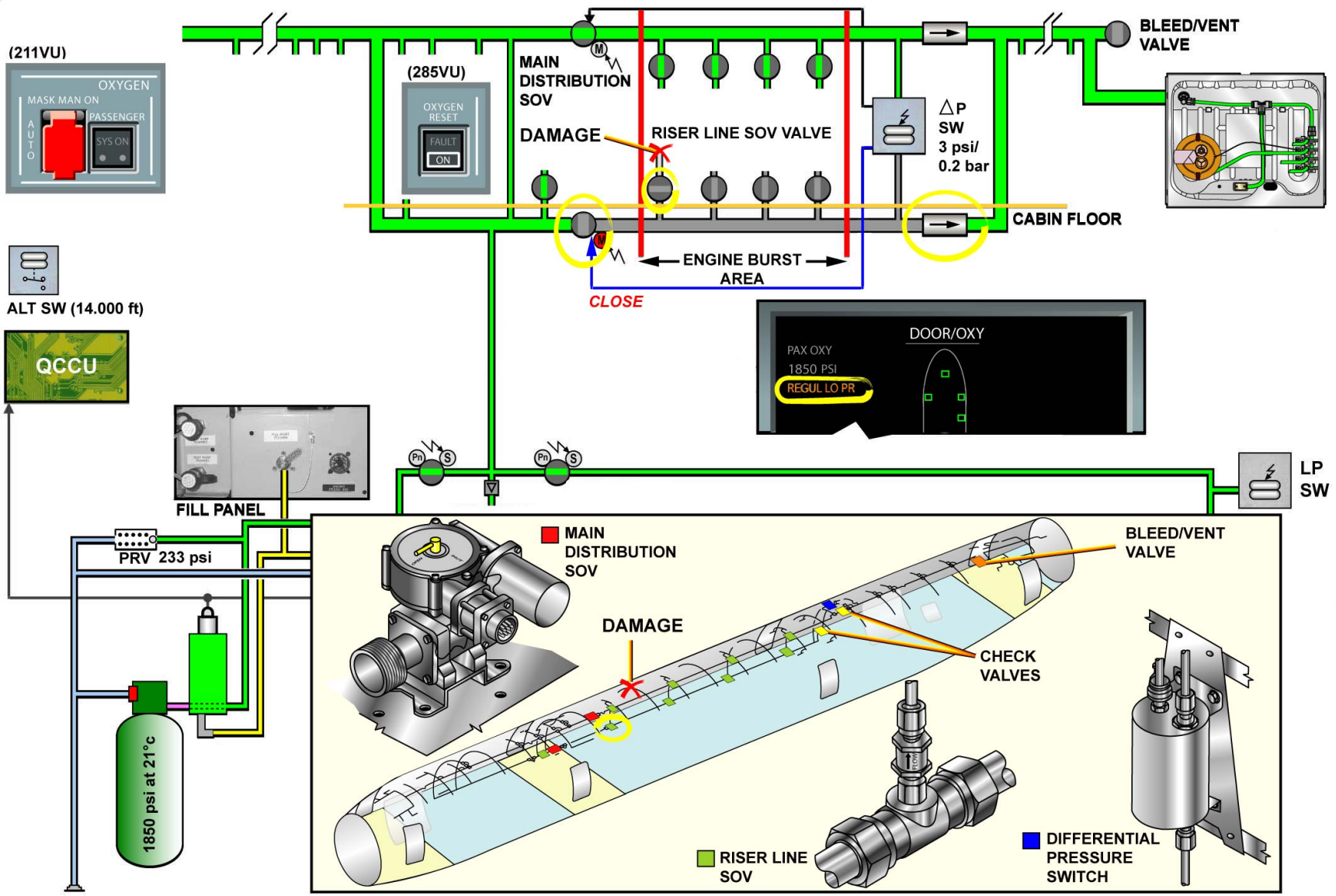

ENGINE BURST - DIFFERENTIAL PRESSURE SWITCH & RISER LINE SOVS

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PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

DOOR/OXY ECAM PAGE

The next slide introduces indicating concerning the passenger oxygen system on the DOOR/OXY ECAM page.

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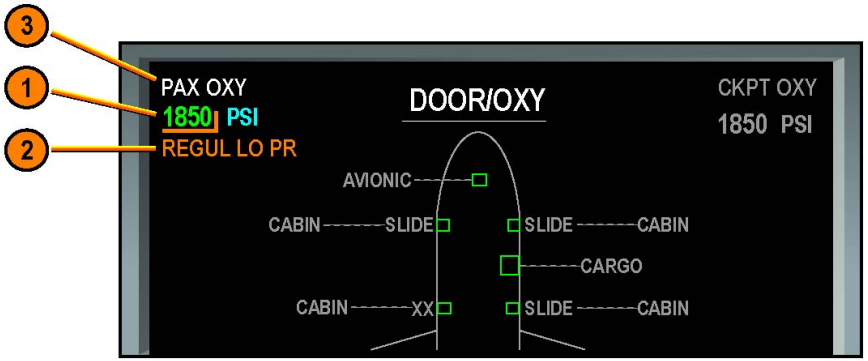


1 OXY high pressure indication

Green (steady) : When pressure is ≥ 1200 psi
Green (pulsing) : When pressure is ≥ 200 psi and < 1200 psi
Amber : When pressure is < 200 psi
An amber half frame appears when oxygen pressure is < 1600 psi

2 REGUL LO PR indication

Appears amber if :
- oxygen pressure on the low-pressure circuit is low (64 psi), or if the low pressure switch fails.
- One of the oxygen regulators is not fully closed and the system has not been activated.
- One of the main distrubution shut off valves is not fully open and the system has not been activated.
- Both main distrubution shut off valves are closed when the system has been activated.

3 PAX OXY indication

It is normally white.
It becomes amber when :
- Pressure goes below 200 psi.
- Low oxygen pressue is detected on the low pressure circuit.
- One or more oxygen cylinders are closed.

DOOR/OXY ECAM PAGE

G9409341 - GAUT0T0 - FM35D3000000001

PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

CMC MESSAGES AND BITE

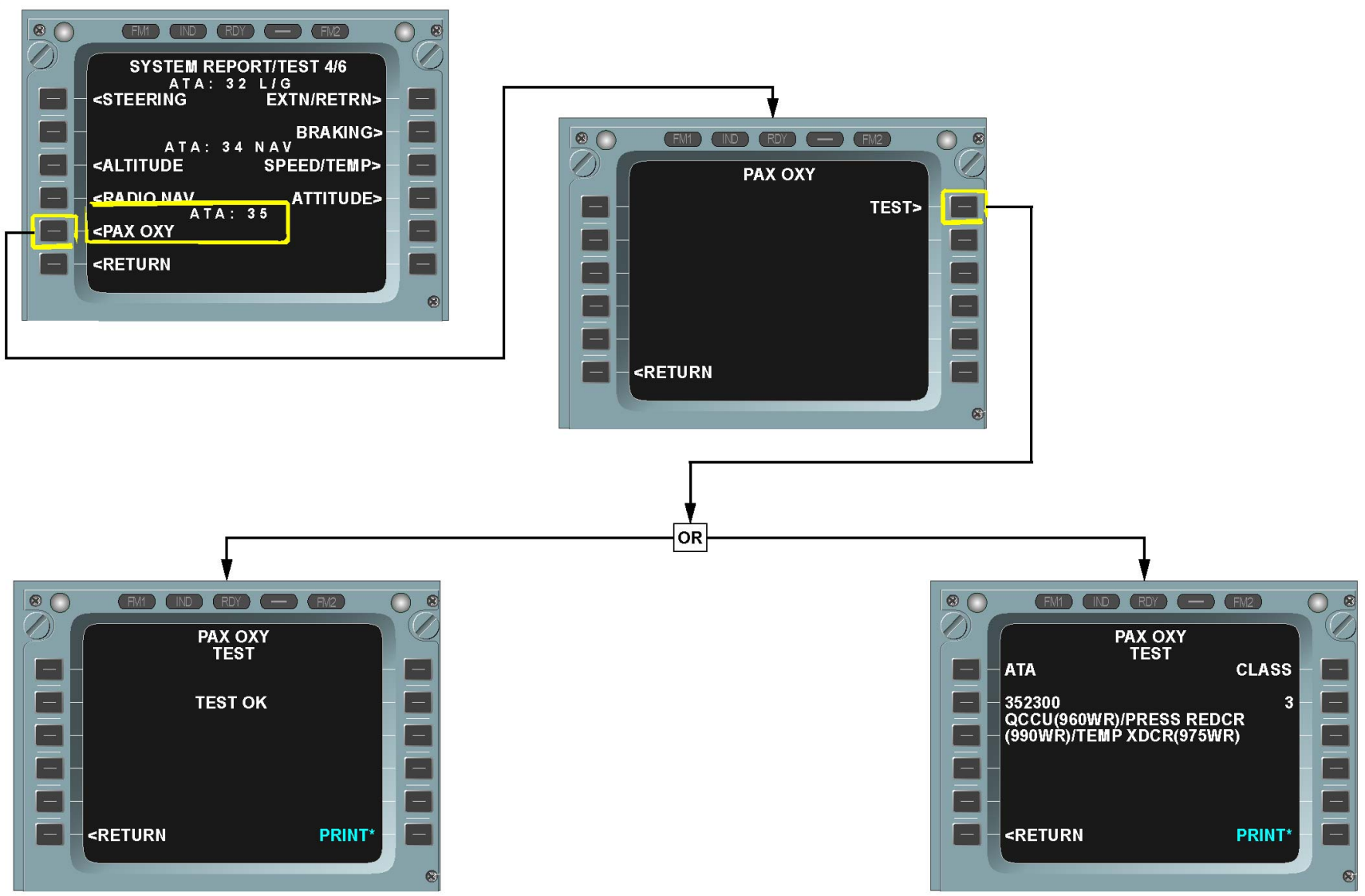
FAILURE MESSAGE TO THE CMC

The applicable message is sent to the CMC if:
- the QCCU fails,
- a pressure transducer fails,
- the temperature transducer fails,
- one or more oxygen regulator or the main distribution SOVs is not in the correct position,
- both main distribution SOVs are closed,
- the pressure after the pressure reducers is too low,
- the low pressure SW fails.

TEST/BITE

The QCCU has power up test and a continuous test. It checks:
- the pressure transmitters,
- the temperature transducer,
- the QCCU.

G9409341 - GAUT0T0 - FM35D3000000001



CMC MESSAGES AND BITE - FAILURE MESSAGE TO THE CMC & TEST/BITE

G9409341 - GAUT0T0 - FM35D3000000001

PASSENGER GASEOUS OXYGEN SYSTEM D/O (3)

QCCU TEST / FUNCTIONAL TEST

There is a warning light on the QCCU for each of the faults. The related light (PRESSURE, COMPUTER or TEMPERATURE) comes on when a fault occurs.
If the fault is corrected, the light stays on until the QCCU is reset or the power is switched off.
The QCCU has a TEST P/B to test the lights on the unit.

NOTE: Before you do a test, you must pull out the door stops and turn them to 90 degrees.
This makes sure that the oxygen masks do not fall out.

To make sure that a door latch assembly releases the door, you can do a ground test with the manual release tool.
To make sure that the pneumatic latches operate correctly; you can do a functional test with the MANual ON P/BSW.
After a functional test, you must also release the pressure from the system through the bleed/vent valve using the dedicated tool (manual release tool).
After a test, you must close the doors, turn the doors stops to 90 degrees and release them.
After a functional test, you must push the RESET P/BSW to set the system back to initial.

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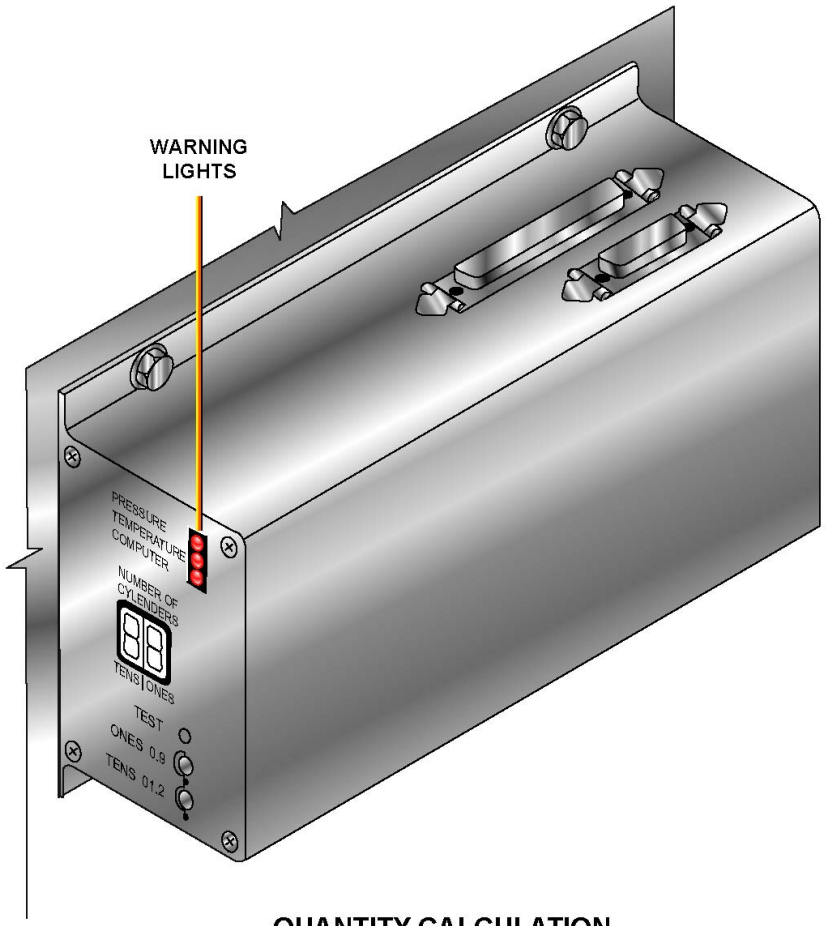

QUANTITY CALCULATION
CONTROL UNIT
(QCCU)

OXYGEN CONTAINER IN TEST POSITION

DOOR STOP
IN TEST POSITION

QCCU TEST / FUNCTIONAL TEST

AIRBUS

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